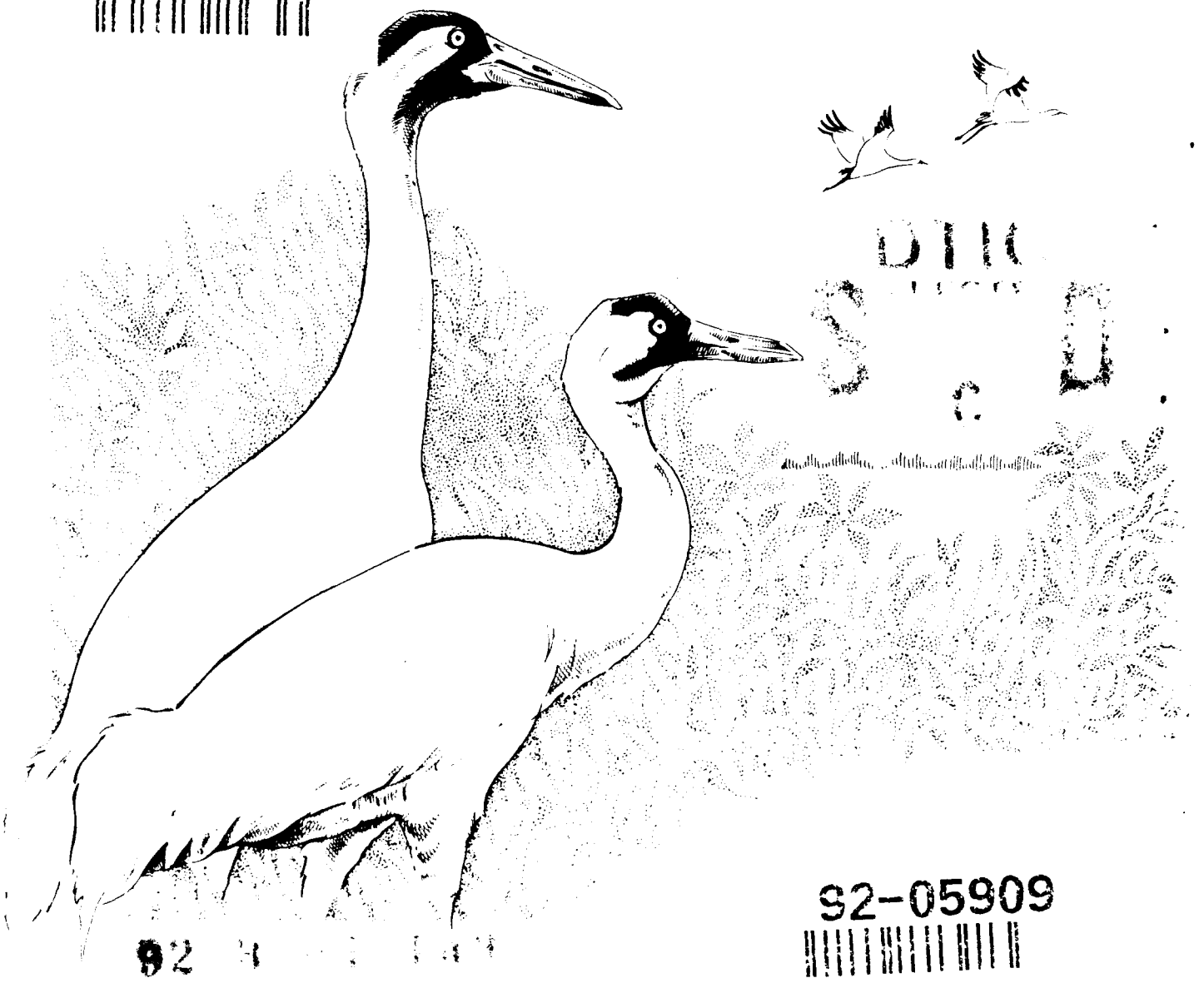
Proceedings

Department of Defense Natural Resources Leadership Conference

Office of the Assistant
Secretary of Defense
(Production and Logistics)



U.S. Air Force Academy, Colorado Springs, CO

August 12-16, 1991

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The Defense Natural Resources Leadership Conference was called to bring together the men and women who are concerned with the stewardship of the 25 million acres of Departmental of Defense land - land rich in wildlife, wetlands, forests, deserts and coastal resources. It allowed those individuals to hear the policies and concerns of their leaders, to share their experiences, to hear from others who face similar challenges, and to renew their committment to wise management, use, and protection of the natural resoruces under their care.

The conference began with plenary sessions in which leaders from both the public and private sectors addressed the conference on national issues and policies. Major themes evolved from the plenary session: stewardship, partnership, and natural resoruces as a strategic issue.

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The plenary sessions were followed by concurrent sessions on Interagency Land Use, Forestry and Land Management, and Wetlands and Fish and Wildlife. Speakers emphasize that both ecosystems and environmental effects extend beyond installation boundaries, and that close cooperation is needed between agencies and between military trainers and natural resources managers. Numerous issues were discussed and innovative strategies presented for the protection and management of endangered species, wildlife, wetlands, riparian areas, coastal resources, and biodiversity; for forestry management; for soil stabilization; for landscaping and grounds management; and for outdoor recreation and other quality of life benefits.

PROCEEDINGS OF THE DEPARTMENT OF DEFENSE NATURAL RESOURCES LEADERSHIP CONFERENCE

U.S. AIR FORCE ACADEMY

Colorado Springs, CO

August 12 - 16, 1991

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, DC 20301-8000

PRODUCTION AND
LOGISTICS

November 22, 1991

MEMORANDUM FOR DEFENSE NATURAL RESOURCES LEADERSHIP CONFERENCE PARTICIPANTS

SUBJECT: Conference Proceedings

I am delighted to provide you with the proceedings of the 1991 Defense Natural Resources Leadership Conference, held at the U.S. Air Force Academy during August 12-16, 1991. This conference reaffirmed Secretary Cheney's commitment to being the federal leader in environmental compliance and protection.

Part of being a leader is being fully committed to environmental stewardship at all levels. Our stewardship must be sensitive and proactive in conserving and restoring the natural resources on DoD installations, and it must be exemplified by a commitment of personnel and money to do the job. We in the Department of Defense are the stewards of more than 25 million acres of land. Our military installations contain some of our Nation's most sensitive and ecologically valuable areas. We must fulfill the expectations of the Secretary, the President, the Congress and the public. We will be measured by our performance in managing the resources we hold in trust.

There was much stimulating, insightful discussion during the conference. Funding, manpower and organizational alignments were recurrent and legitimate themes of discussion. In response, I am directing a review of the natural resources program DoD-wide to address these concerns.

One of our greatest challenges in this decade is to demonstrate the compatibility of using our valuable resources even as we protect them. We must develop new ideas and new approaches to achieving this compatibility. I believe the training of our Armed Forces and the preservation of our environment <u>are</u> compatible. Both share the goals of ensuring our well-being and preserving our quality of life. With the superb talent and commitment of our people, we can both use and protect our precious resources.

We have a great opportunity before us. Let us all commit ourselves to being leaders in the wise use and stewardship of our Nation's natural resources.

Colin McMillan

EXECUTIVE SUMMARY

The Defense Natural Resources Leadership Conference was called to bring together the men and women who are concerned with the stewardship of the 25 million acres of Department of Defense land - land rich in wildlife, wetlands, forests, deserts and coastal resources. It allowed those individuals to hear the policies and concerns of their leaders, to share their experiences, to hear from others who face similar challenges, and to renew their commitment to wise management, use, and protection of the natural resources under their care.

More than 500 military and civilians participated from the Department of Defense, the Bureau of Land Management, the U.S. Fish and Wildlife Service, the USDA Forest Service, the Environmental Protection Agency and other public and private environmental organizations.

The conference began with plenary sessions in which leaders from both the public and private sectors addressed the conference on national issues and policies. Major themes evolved from the plenary session: stewardship, partnership, and natural resources as a strategic issue.

Stewardship

In his keynote address, The Honorable Frank A. Bracken, Deputy Secretary, Department of the Interior, discussed stewardship as a key principle in the Administration's National Strategy for Environmental Quality. The U.S. spends more than $100 billion a year on environmental protection. President Bush has said, "Recovery, Restoration, and Renewal of our environment is a moral imperative."

Stewardship of natural resources already plays a vital role in support of the military mission, as Lieutenant General Henry J. Hatch, Commander and Chief of Engineers, U.S. Army Corps of Engineers, pointed out. Military readiness depends on training and the availability of suitable land resources. Stewardship is the key to environmentally sustainable readiness, since land cannot be discarded, but must be continually re-utilized.

In his discussion of future directions, Mr. Thomas Baca, Deputy Assistant Secretary (Environment), Department of Defense, stated that the training of armed forces and the preservation of the environment are compatible, and outlined the Legacy Resource Management Program funded by the Defense Appropriations Act of 1991. Legacy is a stewardship program which will support an integrated approach to managing, conserving, and restoring the natural and cultural resources under DoD control.

Partnership

A key partnership was highlighted by The Honorable Colin McMillan, Assistant Secretary of Defense (Production and Logistics), Department of Defense: a partnership between military and natural resources professionals in an integrated approach to managing and conserving natural resources for military use.

The importance of the military/natural resources partnership in meeting Secretary of Defense Dick Cheney's goals was emphasized by The Honorable Jacqueline E. Schafer, Assistant Secretary of the Navy (Installations and Environment) at the National Military Fish and Wildlife Association banquet held concurrently. Miss Schafer urged the attendees to communicate natural resources goals, learn about military operational issues, and become informed partners in the decision-making process.

Mr. Richard R. Roldan, Deputy Assistant Secretary for Land and Minerals Management, Department of the Interior, called for innovative options and solutions in Department of Defense/ Department of the Interior partnering. He suggested that DoD could use Interior to assist in natural resource programs, and that Interior could benefit from using DoD technology for natural resources data gathering.

Creative partnerships with state and local agencies and with private non-profit groups and individual volunteers were discussed by many of the speakers. Many excellent examples were given. The shared responsibility for America's environment has created partnerships among DoD and interested citizens, private organizations, and public agencies.

Natural Resources as a Strategic Issue

Mr. R. Neil Sampson, Executive Vice President of the American Forestry Association, suggested that national security is based on economic and political strength as well as military strength, and that natural resources form the base upon which that strength is founded.

Lieutenant General Hatch expanded on this concept in the context of the three stated strategic objectives of the United States: regional stability, free-market economies, and democratic institutions. Reducing environmental degradation supports regional stability, and is a legitimate component of the emerging notion that DoD's function is no longer strictly military conflict. In the broadest sense, natural resources protection is of strategic importance.

The plenary sessions were followed by concurrent sessions on Interagency Land Use, Forestry and Land Management, and Wetlands and Fish and Wildlife. Speakers emphasized that both ecosystems and environmental effects extend beyond installation boundaries, and that close cooperation is needed between agencies and between military trainers and natural resources managers. Numerous issues were discussed and innovative strategies presented for the protection and management of endangered species, wildlife, wetlands, riparian areas, coastal resources, and biodiversity; for forest management; for soil stabilization; for landscaping and grounds management; and for outdoor recreation and other quality of life benefits.

This conference was inspired by Secretary of Defense Dick Cheney's Defense and the Environment Initiative. It was a forum where personnel of the Department of Defense could exchange ideas with other federal, state and nongovernmental agencies, and the public, so that together we can protect our nation's heritage.

ACKNOWLEDGEMENTS

Many people helped plan and execute the 1991 Defense Natural Resources Leadership Conference.

Special thanks go to the U.S. Air Force Academy in Colorado Springs, Colorado, for hosting the conference. In particular, Mr. Mike Babler and other members of the Natural Resources Office, Mr. Virgil Losey and other members of the Protocol Office, and the personnel of the Transportation Division provided much-appreciated support.

The conference planning committee was composed of Dr. Ludlow Clark (Air Force), Mr. Marlo Acock (Marine Corps), Mr. Peter Boice (Office of the Deputy Assistant Secretary of Defense (Environment)), Mr. Berwyn Brown (USDA Forest Service), Mr. Donald Cole (Army), Mr. Thomas Egeland (Navy), Mr. Dwight Hempel (Bureau of Land Management), Mr. James Marsh (Office of the Deputy Assistant Secretary of Defense (Environment)), Mr. Thomas Poole (Army), Mr. Lewis Shotton (Navy), and Dr. Thomas Wray (National Military Fish and Wildlife Association). Their hard work helped to make the conference a success.

Resource Applications, Incorporated, Burke, Virginia, provided administrative support for the conference. Mr. Tom Olmstead, Mr. Aaron Bloedorn, and Ms. Joan Willoughby expertly handled much of the administrative burden, including these proceedings.

Particular thanks go to the conference speakers, moderators, and panelists, who shared their experience and insights with conference participants.

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Keynote Address

Frank A. Bracken
Deputy Secretary
U.S. Department of the Interior

Mr. Bracken was sworn into office as Deputy Secretary, U.S. Department of the Interior, by Vice President Quayle on June 30, 1989. He joined Ball Corporation as Associate General Counsel in 1972; and rose within the company to become Chairman of the Board of Directors for Ball-Incon Glass Packaging Corporation in May 1987. From 1969 to 1972, Mr. Bracken served as Legislative Counsel for the Department of the Interior and was responsible for managing the legislative program of the Department. Prior to accepting that position, Mr. Bracken was in private law practice in Muncie, Indiana.

It's a pleasure to join you here at the Air Force Academy for the Defense Natural Resources Leadership Conference. I want to commend the Department of Defense for sponsoring this conference.

I also want to take this opportunity to express my deep appreciation for the outstanding work of our Armed Forces during Operation Desert Storm.

It was one year ago that Saddam Hussein's troops were ravaging the tiny nation of Kuwait, and threatening the other countries of the region. With the full support of the American people, President Bush put together and led the international coalition that liberated Kuwait.

Our valiant servicemen and women performed their mission with skill and courage, and the American people will never forget their sacrifice. This crisis brought our Nation closer together, and reaffirmed our American values.

In upholding and strengthening these values, President Bush has nominated Clarence Thomas to become an Associate Justice of the Supreme Court. Judge Thomas has demonstrated that hard work and commitment can overcome the obstacles of poverty and racism.

Clarence Thomas has already distinguished himself in the legal profession, and as a public servant. Four times the United States Senate has confirmed Judge Thomas' appointment to high-ranking government positions, the latest to the United States Court of Appeals.

With his experience, keen intellect, and commitment to freedom and equality, Clarence Thomas will be an excellent Associate Justice, and I look forward to his fifth confirmation by the United States Senate.

I also look forward to continuing to advance President Bush's ambitious environmental agenda. Early in this century, President Theodore Roosevelt elevated the preservation of the environment to a national purpose. Now, as this century draws to a close, President Bush is carrying on this great American tradition. Secretary Lujan and I are proud to be a part of this endeavor.

Last year was a major success for this Administration's environmental policies.

In 1990 the Clean Air Act Amendments were enacted, giving the United States a comprehensive set of laws to address acid precipitation, toxic air pollutants, and ozone depletion.

The United States joined in adopting an international agreement to phase out chlorofluorocarbons (CFCs), which deplete the ozone layer.

The 1990 Farm Bill helps farmers protect the quality of water, enhances wildlife habitats, and contains provisions to protect precious wetlands.

We hope to build upon these successes, and continue our progress toward making our skies clearer, our waters purer, and our lands cleaner.

The United States spends more than 100 billion dollars a year on environmental protection, and this figure will continue to grow. President Bush wants to make sure that this money is spent both efficiently and effectively.

That is why this Administration developed the National Strategy for Environmental Quality. This is a long-term approach to addressing this Nation's, and the world's, environmental needs. This strategy is based on six principles:

1) The first is harnessing the power of the marketplace. Economic growth and a quality environment are not mutually exclusive. Instead of relying on burdensome regulations, government should look into expanding incentives for the private sector to invest and apply its research and technical capabilities to benefit the environment. We must involve the private sector in setting reasonable environmental policies, and work with business and industry to reach these goals.

2) Another key principle in this strategy is stewardship. The essence of stewardship is the prudent utilization of some resources, while conserving and enhancing others. We can provide the minerals, timber, and fuel our Nation needs, while also protecting our fragile natural heritage.

This Administration is committed to protecting and, in many cases, expanding our parks, forests, wildlife refuges, and other public lands. Last year, we added over 100,000 acres to the Everglades National Park, most of it being wetlands.

Wetlands are crucial to our environmental well-being and the support of wildlife. They control erosion and sediment flow, and contribute to the improvement of water quality, including drinking water.

3) This strategy also calls for developing creative partnerships. Although most of our Nation's lands are privately held, almost one-third are under the direct control of the Federal government. Only through cooperation among the Federal government, state and local governments, the private sector, and individuals can we maintain a quality environment.

At the Interior Department we work with the private sector in numerous arrangements like recycling programs - with state and local agencies in areas such as wildlife management - and with individual volunteers in everything from cleaning streams to planting trees.

4) Cooperative international solutions are another major element in this plan. The threat to the environment is global, and actions in one area of the world influence the rest of the Earth. Ozone depletion, global warming, and even the oil well fires in Kuwait demonstrate the need for international ooperation on environmental issues.

5) Pollution prevention is the fifth principle of this national strategy. Although cleanup and restoration efforts are crucial in the fight to protect our air, land, and water, prevention is more efficient and cost effective.

By employing new technologies and using natural resources more efficiently, we can significantly reduce the amount of waste and pollution generated. Not only does this benefit the environment, in many cases it makes industry more competitive.

6) The last principle is vigorous law enforcement. For too long, those who illegally damaged the environment did not fear being brought to justice, and even if they were, the penalties were often minor.

Today we are setting records in collecting funds for cleanup projects, for criminal prosecutions, and for levying fines and other penalties for breaking environmental statutes.

Our National Strategy for Environmental Quality is a comprehensive plan that properly balances public and private sector responsibilities.

For our part, Interior is a major player in implementing President Bush's environmental agenda.

Since the first Earth Day, 21 years ago, Interior has added more than 80 million acres to the National Park System and wildlife refuges. At that time the American Bald Eagle, our Nation's symbol, was almost extinct. Today, the Bald Eagle is back, as well as other species of threatened and endangered animals.

Under the North American Wetlands Conservation Act, the Department is looking at 30 projects that will protect 360,000 acres of threatened wetlands and surrounding habitats for wildlife.

Just 10 miles from downtown New Orleans we established the 18,000 acre Bayou Savage National Wildlife Refuge. This refuge supports alligators, blue herons, snowy egrets and many species of fish.

Last year we entered into a joint venture with two corporations to recycle plastic, glass and aluminum in three of our most visited National Parks. In the first two months, 300,000 pounds of material were collected for recycling, and we are looking to expand this project to more of our parks.

Two years ago Interior established the Office of Environmental Affairs, which coordinates the environmental activities of the Department's key bureaus and services. In fact, the cleanup of hazardous and toxic materials on public lands is a top priority initiative for the Department.

As the largest land holder in the Nation, Interior is responsible for a number of environmental activities on its lands. We have over 300 sites on EPA's list of Federal facilities for remediation. Most of these cleanup sites are in remote parts of the country, and as such, were not of immediate concern for cleanup.

Now that ecological restoration is a factor in determining the urgency for remediation, these sites will receive a higher priority. In our latest budget request, we asked for a 20 percent increase in funding for the cleanup of hazardous materials.

The U.S. Department of the Interior also sponsored a scientific conference with 35 participants from the United States and the Soviet Union to discuss issues ranging from preserving the Arctic ecosystem to coastal estuary research.

In addition, we are supporting international wetlands conservation, including the funding of 12 projects to conserve wetlands in Mexico. This results from the 1989 Tripartite Agreement with Mexico and Canada.

Despite these global efforts, the most important environmental action is made by individuals in their own homes, and in their own communities. Effective environmental education is crucial to bringing this message to the public, for without their commitment to a healthier and cleaner environment, all of our efforts will be marginal at best.

Getting the public involved in caring for America's natural legacy is a major point of the Interior Department's new outdoor recreation initiative, "Enjoy Outdoors America." Through this program, we want to instill an environmental ethic among those who use our public lands, and educate them about the value of these resources.

Whether it is fishing, hiking, bicycling, boating, or any other outdoor activity, the quality of the experience depends on the quality of the environment. If the American people want to continue to enjoy outdoor recreation, they must become committed to preserving and enhancing the water, the land, and the wildlife resources involved in that activity.

I would like to add that our host, the Department of Defense, is playing a major role in environmental cleanup programs. Just last week, the New York Times published a major article in which it described this effort as a new strategic goal of the military.

However, the military is not a new player in environmental cleanup and restoration efforts. I recognize the Department of Defense as a solid partner in implementing the environmental policies of the President, in safeguarding the quality of our precious natural heritage, and in the proper stewardship of our vast natural resources. This conference is a symbol of that commitment.

To date, the military has studied nearly 18,000 of its sites for serious pollution damage, and is assessing the need for restoration. Although the most serious of these projects will be expensive, and take years to complete, the Department of Defense will see them through to the end.

As President Bush has said, "Recovery, restoration, and renewal of our environment is a moral imperative." The environment is our most precious resource -- for it sustains all life on this planet. By protecting and enhancing our environment, we are also ensuring our own survival.

I look forward to working with all of you toward achieving our common goal of a cleaner and healthier environment.

* * * * * * * * * *

The Changing Face of the Earth

R. Neil Sampson
Executive Vice President
American Forestry Association

Mr. Sampson has been the Executive Vice President of the American Forestry Association since July 1, 1984. Prior to that, he was the Executive Vice President of the National Association of Conservation Districts for six years. He has been very active in analyzing the implications for agriculture

and forestry in the event of climate changes caused by rising levels of atmospheric "greenhouse gasses." This has led to development of an international campaign entitled "Global ReLeaf," sponsored by the American Forestry Association, that encourages individuals to begin addressing environmental problems by restoring trees and forests.

At the time we began counting the years on our current calendar, it is estimated that the total human population on earth was somewhere in the range of 250 million -- slightly less than live in the United States today. By about 1800, that had grown four-fold, to about 1 billion. The second billion was added in about 1930; the third by about 1960; the fourth by 1975; and the fifth by 1987 or so. The United Nations predicts that we will reach 6 billion well before the turn of the Century, and could possible reach 8 or so by 2025.

What this means, of course, is that humans, whose activities have always been an important factor in earth's environment, may today threaten to overpower natural systems completely. And the pace of the change is, in historical terms, occurring at blinding speed.

If you're my age, you've already seen world population double. If you were born in 1960, they will have doubled before you're 40 years old!

How will the world work, with 6 or 8 billion people? That's a fair question, but the answer may have to be couched in a great deal of conjecture. Because, to tell the truth, we don't know. This is such a far cry from anything ever before experienced that our history gives us little, if any, guidance.

What we know is that it will be vastly different than the world we knew as we grew up. It already is. With the tremendous changes occurring in what we used to know as the Communist bloc, and the Cold War changing so rapidly, President Bush speaks of a New World Order. He's thinking in geo-political terms, no doubt, but I would argue that there will also be a new world order in geo-economic-environmental terms. I can't predict what that new order will look like, at least in any certain terms, but it seems to me that we can outline some of the characteristics it is likely to exhibit.

We've already mentioned the first. Population increases will alter both the face of the earth and the balance between humans and the natural world that supports them. And that impact, while it will be felt everywhere, will not be the same in all regions. In 1950, about 2/3 of the world's 2.5 billion people lived in what is called the lesser-developed regions of the world. That would amount to about 1.6 billion people, trying to work their way out of situations to which the term poverty might be relatively accurate.

By 2000, the United Nations predicts that 4/5 of the world's 6.25 billion people will live in those same regions. Their predictions may be conservative, since they included the Soviet Union in the "more developed" nation category, a judgment that would meet with much debate in light of what we know today about conditions there. Even with that caveat, their estimates for the year 2000 amount to almost 5 billion people, trying to escape circumstances that might best be described as desperation.

Can those people subsist under such conditions? Can the less-developed nations of the world feed, clothe and house such numbers? If they fail, can political borders survive the out-migration pressures of such a huge and desperate horde? What about the in-migration pressures? We only have to look at the tragedy unfolding as Italian policemen club desperate Albanian refugees to realize that this is not some academic problem hidden in a far-distant future. It is with us today. Again, we have no way of predicting how this will unfold as the pressures grow still stronger, but we would be foolish if we were not terribly concerned about the prospects.

The impacts of current population and economic pressures upon the natural environment can already be seen in many places, and the trends give little consolation. In virtually every part of the world today, fertile topsoils are being lost far faster than they can be replaced, croplands are being abandoned, grasslands are turning to desert, and forests are shrinking.

Economists, with their eyes firmly fixed on gross national products and the New York Stock Exchange, see little if any problem. Both of those economic indicators seem to keep rising endlessly. But ecologists, who view the world through very different eyes, are appalled.

In general terms, the farmers of the world are trying to feed an additional 90 million people each year, with something like 24 billion tons less topsoil than they enjoyed the year before. As Lester Brown of Worldwatch Institute notes, that's about equal to losing all of Australia's wheat lands. Each year. It is not terribly surprising, then, when the U.S. Department of Agriculture estimates that, while world grain production increased about 1 percent per year in the last 1980's, population growth rates were about 2 percent. The farmers are losing the race.

Throughout the environment, massive changes are occurring as humans consume the capital base upon which they depend for survival. We don't know how many species have been lost -- or will be lost in the near future. In the case of tropical forests, we are losing species before scientists even know that they exist -- or what they do. It is impossible, of course, to know what that means. Species loss has been a factor throughout earth's history; we know that. But what we do not know is the range of valuable products and services for humankind we are losing, or how many species can be lost before entire ecosystems begin to collapse.

We do know that in the process, major systemic changes occur. In the Chesapeake Bay, warmer temperatures and pollution continue to threaten the entire fishery, in spite of intensive cleanup efforts over the past two decades. In the equatorial rain forests, clearing and burning have changed continental weather patterns, with the water rushing back to the sea from cleared lands instead of recycling back into the clouds to feed interior rain storms. In Eastern Europe, there are rivers too polluted to use for industrial water, and the Aral Sea, once one of the world's largest inland seas and a hugely productive fishery, is now a dying and vanishing resource.

Air pollution affects crop production, forest ecosystems, water bodies, and public health in major regions in the industrial world. Compounds we once thought harmless -- carbon dioxide is a good example -- are building up in the atmosphere as a result of human activities. Chlorofluorocarbons, once thought to be an inert and benign family of gasses, have a powerful chemical effect on the upper layers of ozone, breaking down the outer shield that helps screen out harmful rays from the sun. And all of these compounds, along with a few others, may be increasing the greenhouse effect that many scientists feel has the potential to cause major changes in world climates.

For a variety of reasons, then, people who think about the world in ecological terms believe that humans are rapidly destroying the resource base upon which they depend. We are, as World Bank economist Herman Daly notes, "treating the earth as if it were a business in liquidation."

Will the planet, and its essential life systems, survive such changes? We think it probably will. A study of geologic history suggests it has changed in equally dramatic ways before. But will humans, and their frail institutions, survive? That, it seems to me, is the problem.

In some of the scientific conjecture about the possible effects of global warming, we see the prediction that sea levels could rise a few meters. Would that be a problem to the hydrologic cycles, or to the continents? Probably not. But to people with homes, businesses, and farms in coastal regions, it would be tragic. In the U.S. well over half our people live in the first rim of counties adjacent to the

oceans and the Great Lakes. In Bangladesh and other low-lying countries, entire regions could vanish completely.

Agricultural production and forests could shift dramatic- ally. Again, the total effect might not be too great on ecosystems unless, as has been postulated, this series of changes occurs too rapidly for tree species to migrate and keep up with the climatic shifts. But the ability of entire nations to feed themselves, and the relative balance of power between nations, could change dramatically.

In the face of such massive environmental changes, it seems reasonable to consider how the concept of national security may need to be redefined. National security is not based solely upon armed strength, but upon the economic and political strength that underlies that defense establishment. A nation that cannot feed itself, or control its own hungry and restless people, is not secure from either internal rebellion or outside force. Any nation that destroys its natural resource base, and pollutes its environment, has not only lost its base of national security; it has lost its basis for existence and is doomed. History lists many nation-states that have vanished in this manner.

Seen in this light, the trends that are affecting the global environment today become the primary threat to both national security and the fate of the human race. For those of us raised in the shadow of the Cold War and its nuclear weapons, that is a new -- and somewhat startling -- premise. Those weapons are still frighteningly real, particularly if they become the tools of desperate people. Our attention should turn, however, to the root causes of why people and nations are most likely to grow desperate, and we may find that answer more in environmental terms than in the political or religious terms that have been common through history.

If that premise has any validity, then we must look to the role of the United States as a leader of the New World Order. What can, and should, this country attempt to do? The answers seem to me to be fairly simple.

First, we should continue to lead in terms of values.

This nation is founded upon principles of freedom and individual rights. There is no reason, in light of environmental urgencies, why those principles are not still the most valid we hold. People, and their actions, can be the solution to environmental problems. I'm afraid too many of the environmental battles of the past have been couched in terms of creating new and stricter government controls over people's lives and businesses. We need regulations, of course. Those are the rules by which a society defines itself, and survives. But we must reject our past history of turning every environmental issue into a battle between people who see environmental damage as a terrible problem and those who see governmental intervention in people's lives as a greater threat. What a waste of time and energy!

Instead, it seems to me, we must begin to harness individual energy and effort in the service of an improved environment, rather than in the destruction of natural resources. We must bring citizens, businesses, industries, and organizations together into a common effort to rebuild, restore, and properly manage the natural resource base upon which we must all survive or perish. And we must see this as a problem which does not stop at national borders. This isn't a particularly easy task, but it is one to which far too little effort is being made today -- either by governments or by the private environmental groups.

Secondly, the United States should continue to lead with strength. That includes the strength of our natural resource economic systems, as well as our other forms of power. We must invest in research and development towards more sustainable, energy-efficient, resource-protecting forms of agriculture, forestry, fishing, and minerals extraction. Many of our current technologies were developed in the period shortly after World War II, when fossil fuel energy was cheap, land and capital were

plentiful, and labor was increasingly expensive and scarce. The result was highly mechanized, capital-intensive, energy-wasting forms of production that reduced labor requirements as much as possible. Those technologies, as right as they might have been for the conditions under which they were fostered, are completely out of step with the conditions which we are most likely to face in the 21st Century.

The world tomorrow will be full of people, short on capital and land, and using increasingly scarce and expensive supplies of fossil fuel energy. That suggests entirely different kinds of production technologies, and the time to do the research and development on those new technologies is now, while we are still operating from a strong position.

Finally, of course, the United States must lead by example. It does little or no good to try to "tell" others how to operate. We must show them, by what we do, that better ways exist. We are making progress on this, but not without a significant and painful re-assessment of ways in which we think about humans and their relationship to the environment. We used to think that people and their machines could shape and control the natural world to whatever end we sought. If conditions didn't suit our needs, we'd change them. We called it the "bigger bulldozer syndrome." If we didn't like the way the land worked, we'd just build a bigger bulldozer and push it around to suit what we wanted.

Well, that idea has fallen on hard times. We know now that we seldom really understand the way an ecosystem works, let alone how to build an artificial one. And we're well advised to remember that, the more artificial we make our system, the more we will have to expend to maintain its artificiality in the face of nature's attempts to impose a return to natural processes. How often have we discovered that, in our attempts to manipulate nature, we succeed -- only to learn that what we got in the process was very different than what we planned? Studies of Egypt's experience with Aswan Dam, Russia's experience with the cotton irrigation scheme in the Aral Sea, and our own attempts to channel and alter streams and rivers are consistent in their lesson

We must learn to listen once again to the voice of Aldo Leopold, who told us that those things that strengthen and build natural systems are good, while those that destroy and replace natural systems are bad. We need to learn how to put this advice into practical usage, because we are going to need to manipulate ecosystems as never before if we are to successfully host 6-8 billion humans on earth. And this time, we'd better get more things right, because the stakes are the highest they have been in human history.

That, I would argue, is where the Department of Defense, and its commitment to a new environmental strategy, can be most effective. Your huge department, with its personnel, its bases, its contractors, and its budgets, can be either a horrible example, or an excellent one. I commend Secretary Cheney, and all of your leaders on your initiative to develop a new environmental strategy, one that places the Department of Defense in a leadership role within the Federal government. I have read the proceedings of your September, 1990, Forum, and find much in there with which to be encouraged

There may be some ways, however, that I can challenge you beyond what I found in that report. Obviously, it is essential that you work diligently to meet environmental regulations, reduce toxic hazards, and conduct the business of the Department in a responsible environmental manner. And that is not easy, in light of the tremendous scope of activities you conduct, and the type of missions you perform. The report details many ways in which you are working to achieve those goals. There may be other ways, however, that you might consider or that maybe I missed in my reading of your report.

1) Data and Information. Many of the world's most critical environmental issues are simply not very well understood. We lack basic understanding of the trends that are affecting tropical forests, for

example. The estimates are getting better, but they are still couched in considerable uncertainty. For many years, it has been widely known that the finest available satellite data was that developed by the military, for purposes of surveillance and defense planning. If the world security situation changes so that such information can be made available without compromising America's security, access to your information by environmental scientists and analysts could prove invaluable. If, as I am suggesting, the new world order involves all nations in a joint effort to understand, protect, and restore the natural environments upon which we all depend, sharing such information will be not just advisable, but essential.

2) Base Facilities. Many military base facilities, particularly those in the United States, have developed excellent land management programs. Often, that has happened in spite of having meager budgets and policy attention. You have noted, in your Forum report, that efforts to increase the priority for such activities are needed.

But what about going a bit further, and making those base systems into model environmental management systems, with the natural resources, energy needs, cantonments, and waste management all tied up in an integrated package? Last year, we did a bit of superficial investigation into the opportunities for military bases to contribute to the fight against greenhouse gas buildup. In other words, what could a base do to reduce the emissions of greenhouse gasses such as carbon dioxide? What would be feasible, given the land base, the mission, and the existing situation?

What we found was that there was little most bases could do in the way of planting more forests or changing forest management significantly. Those opportunities have largely been taken. Where we found major opportunities for change involved the base housing and work areas. Here, attention to landscaping could affect energy usage significantly, while lowering maintenance costs as well.

The major opportunities, however, can be achieved when the entire system is planned together. A biomass energy generation system, fed by the unmarketable wood from the base forests, the trimmings from the cantonment areas, and the paper and organic wastes from base activities, could make many bases self-sufficient in energy. At the same time, forest management could be improved on an economic basis and waste disposal problems eased.

For those of us studying these potentials, the most exciting thing is not how much we could affect America's greenhouse gas emissions if military bases were improved. Military bases, as large as they are, are only a tiny fraction of the opportunity. The truly exciting thing is how effectively these base experiments could help us learn the lessons we need to apply to other communities, towns, and neighborhoods in America. By designing an aggressive energy conservation and environment management plan, under the relatively controlled conditions offered by a military base, we can speed essential research and development by decades.

One aspect of this that we are currently negotiating with the Department is the chance to use a few bases as experimental areas to study the energy-saving potential in changing the landscaping and color design of housing areas. We believe that savings of up to 50% are feasible in many areas, and small models have demonstrated this potential. But we lack the neighborhood-scale experiments needed to truly quantify the costs and benefits. Hopefully, a cooperative study involving the Departments of Defense, Energy and Agriculture, as well as the Environmental Protection Agency and the American Forestry Association, will soon become a contributor to this knowledge.

This becomes an additional challenge to the Department, in terms of its base facilities. In addition to trying to operate in an environmentally responsible manner, become essential research facilities for the nation. And then help spread the word. A base that is conducting a successful environmental program ought to also become a community education center. By reaching out to the communities in

which you live, and inviting citizens and leaders to come study your successes, you become a better understood, and better-appreciated, neighbor.

3) Surplus Facilities. It appears that the Department will be closing down many facilities in the coming years. Those closures are difficult, for both the Department and the affected communities. The transitions are inevitably difficult.

There may be opportunities, however, to use some of those facilities in ways that build community economic strength as well as make the Defense Department an important new contributor.

One such idea may be in the form of Materials Recovery Centers. Where you have surplus base facilities near urban areas that include both open space and large buildings, you may be sitting on an essential facility for the community if it can be properly developed. Let me explain one option.

We are currently running out of landfill space, largely because we are throwing away millions of tons of materials that should not, and need not, be discarded. Included are building materials which, if taken down reasonably carefully during demolition, can be re-processed, stored and re-sold for usage. Many materials contain minerals or other products that can be recycled. Finally, after everything has been recovered that is feasible, there are wastes that can be burned for energy production.

For organic wastes, including non-recyclable paper, a topsoil production facility, using some of the new technologies being developed that utilize high populations of soil organisms along with controlled aeration and water, can produce hundreds of tons of valuable topsoil a day.

Around a large urban recovery center, small businesses that use, process, distribute, or sell these materials can locate. Because a recovery center, and its associated spin-off businesses, are likely to be a highly labor-intensive operation able to use large amounts of unskilled or semi-skilled labor, it could be a significant contributor to a community's challenge to provide jobs and dignity to inner city people.

Now, I realize that this is a pretty far-out concept, at least as we look back in time. But as we look ahead, is it so far-fetched, when we compare it to the moot urgent needs we will face? Maybe not. And if not, then today is the time to begin thinking, and dreaming, and experimenting. And, perhaps, the Department of Defense, with its surplus facilities and its need to demonstrate national leadership, is the place to begin.

4) Human Resource Management. A final idea would be to capture the Department's expertise in mobilizing and managing people. As many of you may be aware, providing personnel management for environmental projects would not be a new mission for the armed forces. Many of you may realize that, in the Depression-Era Civilian Conservation Corps, the military played a major role. In fact, they were in charge of CCC camps, and the men in them, from sundown to sunrise. The military arranged for food, clothing, housing, and discipline. During the day, scientists from the civilian agencies directed the work on the land. It made a great partnership, one whose many achievements we still enjoy today in hundreds of state and national parks and other facilities.

As we look at the nation's political agenda today, it is clear that we once again have a human resource problem. We have millions of young Americans who are "falling through the cracks." They need jobs, skills, experience, and discipline.

At the same time, we have serious natural resource problems, many of which require intensive, hands-on, labor-intensive forms of rehabilitation work. Much of this work will not be economically profitable for decades, and much of it will provide benefits such as cleaner water, cleaner air, and a

more robust and productive downstream fishery that will never bring direct profits back to land owners or managers. So we must make these investments in ecosystem restoration in the public sector, or they won't be made.

We need facilities on public lands for recreation, for administration, for improved resource management.

It doesn't take much to see a major new leadership role for the military in becoming a full partner in this kind of national effort to link those human and natural resource problems into a new form of public works that is truly aimed at the public's long-term good.

I would also argue that this is an essential leadership role for the United States. If this country, with its marvelously capable institutions, and its tremendous wealth, cannot demonstrate to the rest of the world how to put people to work building productivity, economic strength, and environmental stability, where else in the world can it be done? If we agree that the future of the world depends upon our ability to capture and direct the energies of huge human populations in environmentally-constructive, instead of environmentally-destructive ways, where else would you start?

Bangladesh? West Africa? Central America? Not I. Those regions have problems that make ours pale by comparison. If we can't - or won't - address our much more manageable challenges, it is unthinkable to criticize them for avoiding theirs. If we aspire to leadership in the new world order, we'd better lead. And the time for leadership is now, but fast slipping away.

Obviously, there are many other opportunities and challenges, some of which you have already identified and more which will become obvious as we move forward. It seems to me that the essential challenge is that we do, indeed, move forward. The Department of Defense, with its huge assets, can become a national leader, and a major part of the global leadership that will be expected of the United States. Your policy commitment is clear; now you must reach for both vision and energy beyond anything you have ever before attempted in this field. As one representative of the nation's environmental community, I commend you for your beginnings, challenge you to reach still further, and pledge the help and support of my organization in your efforts.

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Managing for Biodiversity

Dr. Jerry F. Franklin
Chief Plant Ecologist
Pacific Northwest Research Station
U.S. Department of Agriculture Forest Service

Dr. Franklin has been a research scientist for the USDA Forest Service Pacific Northwest Reserve Station since 1989 and is currently Chief Plant Ecologist. In addition to his Forest Service position he is currently Bloedel Professor of Ecosystem Studies in the College of Forest Resources, University of Washington, Seattle, Washington.

We regret that no text or abstract of Dr. Franklin's presentation is available.

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The President's Wetlands Policy: Stewardship of a Vital Resource

June M. Whelan
Special Assistant to the Secretary for Wetlands
Chair, Wetlands Policy Group
U.S. Department of the Interior

Ms. Whelan currently serves as Special Assistant to the Secretary of the Interior for Wetlands, and as Chair of the Department of the Interior's Working Group on Wetlands Policy. The purpose of the Wetlands Working Group is to utilize the unique resources of the Department's land and water resource management bureaus, the Fish and Wildlife Service, the National Park Service, the Bureau of Land Management and the Bureau of Reclamation, and the research and technical assistance capabilities found in the Geological Survey, Bureau of Mines, and the Office of Surface Mining.

It is a pleasure for me to be here today and to describe the President's new wetlands program.

In my role as Special Assistant to the Secretary I also chair the Department of the Interior's Working Group on Wetlands Policy. The purpose of the policy group is to harness the resources at Interior in support of the President's, and the Secretary's, wetlands initiatives.

Last summer, I also worked with the Domestic Policy Council's Wetlands Interagency Task Force, chaired by Teresa Gorman, Associate Director for Energy, Science, and Technology, in the Office of Policy Development at the White House. As you will recall, this Task Force visited six cities -- Bismarck, Peoria, New Orleans, Olympia, and Providence -- to receive public input regarding the President's policy of "no net loss" of wetlands.

I would also like to mention that for more than ten years I worked for a company that had significant activities in the State of Wyoming. During that time, I had an opportunity to work very closely with Secretary Cheney. I know that environmental issues on military lands are important to Secretary Cheney, and I understand from talking with his staff this past weekend that about one year ago, he signed a policy statement on the clean-up of hazardous wastes.

What I would like to do here is to describe the President's new and comprehensive wetlands plan that was announced last Friday, to mention some of the wetlands activities we have underway at Interior, and to highlight some of the areas where I think Defense and Interior will be working together.

On Friday, August 9th, President Bush announced a new comprehensive plan for improving the protection of the nation's wetlands. The Administration's three-part plan will slow and eventually stop the net loss of wetlands, taking a significant step towards the President's goal of "no net loss" of wetlands. The plan:

- strengthens wetlands acquisition programs and other efforts to protect wetlands;
- issues for public comment a revised interagency manual defining wetlands, to ensure that it is workable; and
- sets forth new mechanisms to improve and streamline the current 404 regulatory program.

Three-quarters of the remaining wetlands are privately owned, and the pressure to serve other valid human needs often comes in conflict with the conservation of this resource. A coordinated

wetlands policy requires balancing all of these interests.

The President believes we must look beyond regulation to encourage wetlands protection. We must enhance public understanding of the value of wetlands as well as support non-regulatory programs that encourage private, state and local actions to conserve wetlands.

Wetlands Expansion Measures

Since taking office, the Bush Administration has proposed:

- the purchase of approximately 450,000 acres, at a cost of over $200 million, of critical wetland habitat;

- a 48 percent overall funding increase for wetlands protection efforts in the FY '92 budget, to $709 million;

- a nearly three-fold increase, from $16 million in FY '89 to $45 million in FY '92, for wetlands research and development (a significant portion of which went to the Corps of Engineers); and

- the establishment of a 600,000 acre wetlands reserve under the '90 Farm Bill.

Wetlands Laws Signed by President Bush

President Bush has made us sensitive to the fact that wetlands are a resource which must be preserved, protected and maintained. He has signed several legislative initiatives into law, including:

* The Everglades Park Protection and Expansion Act (Florida)
* The Lahontan Valley Wetlands Initiative included in the Truckee-Carson-Pyramid Lake Settlement Act (Nevada)
* The Coastal Barriers Resources Improvement Act of 1990;
* The Louisiana Coastal Wetlands Restoration and Planning Act; and
* The North American Wetlands Conservation Act

Even the 1990 Farm Bill has significant and important components in it.

The Everglades National Park Protection and Expansion Act, signed by the President in December 1989, provides for the acquisition of 108,000 acres of wetlands in the Everglades National Park. Specifically, the legislation provides for the restoration of Shark River Slough, which is a complex of freshwater sloughs (predominantly sawgrass and peat deposits, wet prairies, and hardwood hammocks and mangrove swamps) which drain into the estuaries of the Florida Bay.

The Truckee-Carson-Pyramid Settlement Act provides for the Lahontan Valley Wetlands Initiative. For nearly a century, conflicting demands for the use of waters from the Truckee and Carson Rivers in and around Stillwater National Wildlife Refuge have resulted in significantly adverse impacts to area fish and wildlife resources. Wetlands in the Lahontan Valley have been reduced by over 60 percent, and many of the remaining areas have been contaminated by concentrations of minerals resulting from low water levels. This new law authorizes the FWS to acquire sufficient water rights from willing sellers to sustain 25,000 acres of wetlands in the Lahontan Valley and to promote the conservation and recovery of threatened and endangered fishes in Pyramid Lake in Nevada.

The North American Wetlands Conservation Act supports the North American Waterfowl Management Plan (NAWMP) and broadens the scope of the NAWMP to all wetlands ecosystems for migratory birds.

The North American Waterfowl Management Plan, an international program to conserve wetlands and restore waterfowl population, is stepping up its efforts in the West. The Plan, established in 1986, is a unique partnership of the Federal Governments of the United States, Canada and Mexico, as well as states and provinces and more than 200 conservation groups.

I understand many Department of Defense field installations are included in the NAWMP.

New Wetlands Initiatives to Enhance and Protect Wetlands

In announcing his plans, the President identified several initiatives to enhance wetlands protection on Federal and public lands. These include:

- Full funding of the Wetlands Reserve Program in the 1990 Farm Bill. The 1990 Farm Bill authorized the protection of up to 1 million acres of wetlands. The Administration will work for this amount in FY 1993 and future budgets.

- Initiation of an Administration-wide wetlands restoration and creation program on Federal lands. Many agencies, including Interior, EPA, Defense, Commerce, and Energy, have the potential to engage in restoration and creation programs. These activities will be strengthened and coordinated through a standing interagency task force that will develop an overall policy for the most effective use of new and existing Federal resources.

- Continuing to make wetlands a priority in the allocation of Land and Water Conservation Funds (LWCF). The Administration will seek to maintain or increase funding for this program.

- Continuing to expand the existing satellite monitoring program to periodically assess national wetland trends. Satellite imagery provides up-to-date information on the status and trends of wetlands, and can help in conducting periodic change analysis of high-value wetland areas. The Administration is accelerating and improving our national inventory of wetlands, with more geographically targeted reporting, and monitoring of the ecological health of our wetlands.

- Expanding research on wetlands. Several agencies independently conduct research on wetlands. The Administration is establishing a process to coordinate, consolidate and establish priorities for wetlands research.

- Focussing public outreach and education programs on informing the regulated community about Federal wetlands regulations.

- Revising the existing Executive Order on wetlands to emphasize wetlands stewardship on Federal lands and the acquisition of valuable wetlands. The Administration will revise the Executive Order to include a commitment to the "no net loss" goal.

Delineation Manual

On January 10, 1989 the Environmental Protection Agency, the Army Corps of Engineers, the Fish and Wildlife Service, and the Soil Conservation Service issued a joint "Federal Manual for the Identification and Delineation of Wetlands", to address inconsistencies in practices among the agencies. The Manual established the technical criteria and procedures used to define a wetland.

In response to public comments and field hearings, the Administration is sending to the Federal Register a revised Manual that will incorporate changes to clarify the scope and application of the manual.

Wetland hydrology is the driving force creating wetlands. In the proposed Manual, wetland hydrology will be defined as the permanent or periodic inundation, or soil saturation for a significant period, of an area. This will include inundation for 15 or more consecutive days, or saturation from surface water or from groundwater to the surface for 21 or more consecutive days. The growing period will be defined as three weeks before the first and after the last average frost dates.

The Manual will specifically ask for public comment in several areas. For example:

* For an area to be delineated as a vegetated wetland it must have three components: wetlands hydrology, hydric soil and hydrophytic vegetation. The Manual establishes criteria for each of these components and asks the public whether there should be any exceptions.

* Secondary indicators can often indicate wetlands. Should secondary indicators such as stained leaves, trunks or stems be viewed an indicators of hydrology?

* There are "harder to identify wetlands" that meet regulatory definition, but which only meet two of the three criteria. The proposed Manual identifies several of these wetlands -- including playa lakes, vernal pools, and prairie potholes -- as wetlands. Should there be other exceptions?

Streamlining Wetlands Regulations and Adding Flexibility

To streamline the regulatory process, the Administration proposes a number of reforms to ensure more timely decisions and effective coordination among agencies. These include requirements to:

- Issue a regulatory guidance letter providing that meetings and other interactions between the public, applicant and Federal government will be coordinated through a single agency, the Army Corps of Engineers. The Corps would serve as the project manager, and would be responsible for all consultations with other agencies on the permit application and for determining the final permit condition;

- Encourage attendance by all interested agencies at the preapplication meetings with the permittee and early consultation on the types and location of mitigation that will be required if wetland losses occur;

- Initiate a wetlands delineation training program for private consultants and better train agency field staff on wetlands functions, values and delineation, using cross-agency training programs to the extent appropriate;

- Deem permits approved within six months if an agency does not extend the deadline for good cause as determined by the Corps of Engineers;

- Require consulting agencies to provide site-specific information when commenting on individual permits;

- Replace consulting agency appeals of individual permits with appeals based on resources or issues of national significance; and

- Expand the use of general permits.

Interagency Technical Committee

As part of the President's new program, the Administration will establish an interagency technical committee to:

* Define a limited number of major wetland categories based on function, value and relative scarcity or abundance of different wetlands. This committee will complete its work within 18 months and will consult with outside experts; and

* Refine the details of a market-oriented mitigation banking system, designed to provide adequate incentives for the private restoration or creation of wetlands that can be used to mitigate the effects of developed wetlands.

The mitigation banking system will:

* Allow permit applicants to satisfy compensatory mitigation requirements through the use of "mitigation credits";

* Presume satisfaction of permit conditions if the mitigation credits are from the same or a higher wetland category; and

* Replace the preference for on-site mitigation for all wetlands except those in the highest wetland category with a preference for mitigation within States or within major hydrological units which may cross state lines.

Department of the Interior

As part of Interior's wetlands activities, on July 16, 1991, the Department hosted a Wetlands Symposium to describe "on the ground" case studies where wetlands are being restored on the Federal lands of Interior.

As Federal land and water resource managers, the Department of the Interior is working to preserve, protect, enhance, restore and create wetlands -- and we want to begin to do a better job of sharing this information with the public.

At the Symposium, the National Park Service described how it is restoring the salt marsh at Cape Cod National Seashore in Massachusetts and working with the local community.

The Fish and Wildlife Service described some of the work it is doing in the "bottomland hardwood complexes in the Southeast", particularly in the lower Mississippi delta area.

The Bureau of Reclamation and the Fish and Wildlife Service described the work they are doing in the prairie pothole region of the Dakotas and Minnesota.

We also had a session describing "Wetlands Restoration Activities in a Multiple Use Environment." At this session, the Bureau of Land Management described its activities of restoration/enhancement in the arid environment of the western United States.

The Bureau of Indian Affairs described its work with the Tribes on freshwater wetlands near Minneapolis.

There are also significant opportunities to create wetlands as a post-mining land use. The Office of Surface Mining described some of its mined land reclamation activities and the Bureau of Mines told of its research on the construction of impoundments to treat acid mine drainage in eastern Appalachia.

Both the Geological Survey and the Minerals Management Service talked of their work in the Gulf of Mexico working with the State of Louisiana regarding the serious wetland losses in the state.

We also included in our program a session on the technical assistance which the Fish and Wildlife Service provides to the farming community; and the latest report on the North American Waterfowl Program.

We now know wetlands are a viable resource. Wherever they are, from the Everglades to Alaska, from California to the Great Dismal Swamp, wetlands have important ecological values and functions. In their natural state, they produce numerous benefits for society, benefits which are either irreplaceable if lost, or can only be replaced at immense expense. Broadly, wetlands regulate water flows, storing water and buffering the effects of storms; filter and help to purify water; and provide essential habitat for plants and animals.

Wetlands provide habitat for many species of fish and wildlife, including migratory birds, endangered species, commercially and recreationally important fish, shellfish and furbearers, and many species of wild plants. One-third of the Nation's endangered or threatened species live in, or are dependent on, wetlands. Between 60% and 90% of U.S. commercial fisheries use coastal wetlands as spawning grounds and nurseries.

As natural regulators of water flows, wetlands provide a cost-effective means of flood control, slowing and retaining water during periods of high runoff.

As stewards of the nation's public lands, Secretary Lujan, and the Department of the Interior and its bureaus, work daily to support the President's goal of wetlands conservation. We must set a good example for others to follow as we manage the lands under our jurisdiction. The land and water resource managers of the Department have years of experience and expertise working in wetland environments. Hopefully, this base of knowledge will serve to guide others in a common effort to protect, enhance, and restore our wetland resources.

The lands managed by the Department of the Interior provide a "living laboratory" to practice wetlands stewardship. They present an opportunity to improve our ability to manage wetlands and expand our technical knowledge. We need to better protect, enhance, restore and work to create this resource.

Defense/Interior Coordination

There are several areas where I believe Interior will be working most closely with Defense and other agencies as a result of the President's new program, including:

- the initiation of restoration and creation programs on Federal lands;
- the expansion of research on wetlands;
- increased public outreach; and
- the revision of the Executive Order.

Many of these new assignments to the Executive Branch agencies will be an expansion of things we are already doing -- and in some it will be new assignments.

We look forward to working with you.

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Wetlands -- Value and Status

Dr. Robert E. Stewart
Director
National Wetlands Research Center
U.S. Fish and Wildlife Service

Dr. Stewart is the Director of the National Wetlands Research Center and is responsible for the U.S. Fish and Wildlife Service's research on wetlands ecology, wintering waterfowl, and related technology development. While national in scope, the Research Center has special expertise on coastal wetlands. In particular, the Center addresses issues affecting wetlands and wintering waterfowl in the southern United States.

Wetlands are unevenly distributed on the face of the land and have a myriad of technical descriptors. In concert with this, wetlands also have numerous "values", each with its own myriad of qualitative or quantitative descriptors. Once considered "waste lands," wetlands are now recognized as providing critical goods and services to humankind. These include: flood attenuation, fish or wildlife habitat, storm force reduction, erosion control, regional climate control, biodiversity, nutrient sinks, water quality maintenance, carbon fixation (global change moderation), drought relief, aquifer and ground water recharge, and drinking water.

Wetlands have been altered and lost at very high rates since European settlement. Most of these losses have been due to agricultural land use or practices. The most recent survey indicates that wetland losses continue nationwide, albeit at a somewhat lower rate than the previous 30-year period, while losses of forested wetlands accelerate, particularly the forested wetlands of the southeastern United States.

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Endangered Species: National Issues and Strategies

Ralph O. Morgenweck
Assistant Director - Fish and Wildlife Enhancement
U.S. Fish and Wildlife Service

Dr. Morgenweck was appointed Assistant Director - Fish and Wildlife Enhancement in May 1988. Previously, he was the Director of the U.S. Fish and Wildlife Service's National Ecology Research Center in Fort Collins, Colorado. Dr. Morgenweck also served as a natural resource specialist in the Minerals Division of the Minnesota Department of Natural Resources.

Since passage of the Endangered Species Act in 1973, the endangered species program has expanded considerably in scope and responsibility. Through the Act, Congress mandated that all

Federal agencies use existing authorities to conserve those wildlife and plant resources that are in danger of extinction. The Act established a strong leadership role for the Federal Government.

As the endangered species program approaches the twenty-first century, five basic areas are emerging as the focal points of the program within the Fish and Wildlife Service. They include:

1) a strengthened recovery program for U.S. listed species that focuses on development of recovery plans and implementation of high priority recovery tasks identified in recovery plans to avoid the unnecessary loss of recovery flexibility;

2) an improved Section 7 program that promotes inter-agency communication and encourages other Federal agencies to develop in-house capabilities to comply with the Endangered Species Act;

3) increased emphasis on "prelisting recovery" or "prelisting conservation" to reduce the number of species that are in need of, or eventually may need, listing;

4) expeditious listing of species to preserve options for recovery of species before these opportunities erode; and

5) concentration on the conservation of ecosystems that support endangered, threatened and/or candidate species to maintain the integrity of these ecosystems and to promote recovery of listed and candidate species.

The Service recognizes the important role the Department of Defense lands can play in the pursuit of these goals, and encourages continued development of partnerships to help conserve the nation's biological diversity.

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Nonpoint Source Pollution: National Issues & Strategies

David Davis
Deputy Director
Office of Wetlands, Oceans, and Watersheds
U.S. Environmental Protection Agency

Mr. Davis assumed the position of Deputy Director, Office of Wetlands Protection, Oceans, and Watersheds in 1991 following a career in the Environmental Protection Agency spanning more than seventeen years. From 1987 to 1991, he was Director of the Office of Wetlands Protection.

The nature and scope of nonpoint source pollution nationally were discussed, as well as an outline of current national programs to reduce and prevent such pollution. Included were linkages with the efforts of other Federal agencies, and a brief discussion of anticipated new directions in national nonpoint source control strategies. The nonpoint source rankings in recent comparative risk ranking studies conducted by EPA were discussed.

Illustrating with slides, Mr. Davis discussed the leading nonpoint source categories (agriculture, urban runoff including construction, forestry and grazing) and pollutants. He also illustrated some of the management practices currently used to control and prevent nonpoint source pollution. He

summarized and updated current national nonpoint source program efforts, including those under the Clean Water Act and the Coastal Zone Reauthorization Amendments of 1990.

Finally, he discussed new directions in national nonpoint source strategies anticipated as a result of EPA's experience with management of the national nonpoint source program and near-term legislative developments.

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Natural Resource Trusteeship and Damage Assessments Under CERCLA (Superfund) and the Oil Pollution Act

Grayson Cecil
Special Counsel for Natural Resources
National Oceanic & Atmospheric Administration
U.S. Department of Commerce
and
Dr. Jonathan Deason
Director of Environmental Affairs
U.S. Department of the Interior

Ms. Cecil has served as Special Counsel for Natural Resources at the National Oceanic & Atmospheric Administration since 1989. In her present position, Ms. Cecil acts as Trustee for natural resources under the Superfund and Oil Pollution Acts. She has assisted in the development of the first Damage Assessment and Restoration Program in the Administration -- a multi-disciplinary program composed of scientists, economists and attorneys. She oversees the development of damage assessment regulations for the Oil Pollution Act, and directs damage assessment and litigation matters for cases involving releases of toxic substances and oil spills.

Dr. Deason has been the Director of Environmental Affairs for the U.S. Department of the Interior since July 1989. In that position, he oversees nine regional offices and a Washington D.C. staff of environmental professionals. He is responsible for ensuring that Interior Department projects and activities comply with a wide range of environmental laws, such as the National Environmental Policy Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation and Liability Act (Superfund).

The Superfund law is widely known by now, after slightly more than ten years of existence, as a law giving EPA the authority (and part of the money) necessary to clean up inactive hazardous waste sites.

There is another innovative provision of Superfund that is not so widely known -- legal authority for natural resource trustees to make potentially responsible parties (PRPs) pay compensation for natural resources injured by releases of hazardous substances. The purpose of this provision of Superfund is that natural resource management agencies are responsible for seeing that natural resources will be restored to pre-spill or pre-site conditions, while EPA is ensuring cleanup of the hazardous substances themselves.

Until the publicity generated in the aftermath of the Exxon Valdez oil spill, these Superfund provisions were virtually a secret, probably because no special provision was made for funding the

natural resource damage assessments necessary to prove such claims.

The Oil Pollution Act of 1990 clarified natural trustee provisions for oil spills comparable to those previously available under CERCLA, and authorized use of the Oil Pollution Fund for at least the initiation of damage assessments due to oil spills. Tapping private industry PRPs to fund damage assessments works in some cases.

The Congress is beginning to allow agencies appropriations for damage assessment, on a revolving fund basis, to be paid back to PRPs when damage claims are settled, in or out of court.

The Departments and Agencies of the Department of Defense, as major Federal landholders, are major Federal trustees. The fact that DoD may also be the responsible party only makes their compliance the more challenging. Interior and the Forest Service in Agriculture can have similar combinations of site manager and trustee responsibilities. Mobile resources such as birds and fish mean that Interior and NOAA may be co-trustees with Defense agencies.

The Federal natural resource management agencies -- such as Interior, NOAA and the Forest Service -- want to enter into proactive partnership with the military agencies not only to comply with the law, but to use the best tools available to serve the nation's citizens, our neighbors and the users of our lands and facilities as Superfund intended: not just for cleanup, but for restoration of environmental services and values.

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The DoD/DoI Partnership: Dedicate[illegible]ne Stewardship of Our Nation's Natural Resources

Richard R. Roldan
Deputy Assistant Secretary for Land and Minerals Management
U.S. Department of the Interior

As Deputy Assistant Secretary for Land and Minerals Management, Mr. Roldan serves the Assistant Secretary in matters pertaining to the management of three principal bureaus of the Department of the Interior: the Bureau of Land Management (BLM), the Minerals Management Service (MMS), and the Office of Surface Mining Reclamation and Enforcement (OSM).

Management responsibility for these three bureaus includes many of the major issues facing the United States and its public land users today -- oil, gas and coal production, livestock grazing, timber harvest, protection of wildlife habitat and recreation, cultural and wilderness management.

We are expected to do more natural resources management with fewer dollars. Through cooperation between the Department of Defense and the Department of the Interior, we can create a synergistic effect that will help meet this demand.

Mr. Roldan called for innovative options and solutions in Department of Defense/Department of Interior partnering, and recommended that DoD use the resources of Interior to assist on all natural resources programs. He also recommended transferring to DoI the appropriate natural resource data-gathering DoD technology.

The public has very high expectations of what will be accomplished with environmental tax dollars, and each agency must help the other to achieve efficient and effective programs.

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Banquet Remarks

The Honorable Colin McMillan
Assistant Secretary of Defense (Production and Logistics)
U.S. Department of Defense

Mr. McMillan, after being nominated by President Bush and confirmed by the United States Senate, took the oath of office as the Assistant Secretary of Defense (Production and Logistics) on March 5, 1990. As Assistant Secretary, he oversees the Department of Defense in the areas of weapons production, industrial base, procurement logistics, environment, installations and base closures, and other activities. He also has oversight responsibility for the Defense Logistics Agency and the Defense Commissary Agency.

On behalf of Secretary Dick Cheney, I appreciate the opportunity to become part of this important conference and to share my thoughts with you who are so involved in improving our environment.

Our situation is promising. President Bush has made a strong commitment to improve the environment. Secretary Cheney said last year that he wanted the Department of Defense to be "the Federal leader in environmental compliance and protection." We in DoD are committed to that goal. And, we've put our money where our mouth is. As we are reducing the DoD budget by 25% over five years, we are tripling our environmental compliance and cleanup budget from approximately $1 billion in 1990 to $3 billion in 1993.

We have the creativity of the young people in our armed forces that enabled us to deploy one-half million men and women half-way around the world to southwest Asia. The intellect, skill and determination that allowed our forces to deliver laser-guided gravity bombs to their targets 999 out of every 1,000 times, and the compassion used in feeding and caring for the Kurdish refugees, are all exactly the traits necessary to address environmental problems.

It sounds like we have everything we need - commitment from our top leadership, money and talent. Those are essential ingredients for any job.

But there is much more needed.

The people in this room will need to provide direction. At your individual bases, you need an integrated approach to manage, conserve and restore priceless natural and cultural resources which exist on our lands. That means that you must develop a strategy that insists on good range management -- management which allows tanks to deploy in combat training exercises while doing minimum damage. A strategy that allows wildlife to prosper even while artillery units are lobbing 105mm rounds into range target areas. A strategy that maintains facilities that can be used by our young Marines and Sailors one day for recreation and the next day as the location for a practice amphibious assault by those same Marines and Sailors.

Let me give you some real-life examples of how those strategies are working today in the Department of Defense:

At Fort Carson, just a few miles from here, the Army took the initiative to acquire more land for training. It took steps necessary to repair damaged portions of the land previously used for training. It developed a comprehensive plan for natural resources management. It spent more than $6 million for seeding, land, treatment, erosion control, and technical studies. This example illustrates that protecting the environment and accomplishing our mission are compatible.

At Tyndall Air Force Base in Florida, environmental officials discovered that extensive activities on the beaches were destroying nesting grounds for endangered sea turtles and state-protected birds. Tyndall initiated a program to enforce natural resource protection regulations. This initiative led to the doubling of the nesting rate of sea turtles without jeopardizing the training mission. As a result of their initiative, there was an increase in citizen involvement.

At Indian Island in the Puget Sound, the Navy has effectively produced a marsh, a bird sanctuary, a healthy deer herd, nesting eagles and miles of beaches teeming with clams. Although Indian Island is only 2,700 acres, the Department's natural resources program applies to small as well as large installations. That's Leadership. That's Stewardship. That's Commitment.

As you become engrossed in the stewardship of those lands for which you are responsible, remember that the military's daily job is to prepare their leaders, their personnel, and their equipment to fight and win. That mission comes first. In order to accomplish this mission, we need training at ranges where we can drive armored vehicles, fire weapons and drop bombs. Our pilots need to fly at low levels as they would in combat.

Yes, we are serious about our mission. But we are also serious about being a leader in protecting the environment. Tripling the budget for environmental compliance and restoration is not an end in itself - it is the means. We need to have clearly defined goals and we are working on them. They include:

1) A time certain when the Department of Defense will be in compliance with all appropriate environmental laws.

2) Completion of the process of identifying all installation contamination sites and commitment to a cleanup schedule.

3) Significant reductions in the generation of solid waste and hazardous materials.

4) A review of all military specifications and standards to determine when alternate materials processes would reduce environmental risk.

5) Implementation of community outreach plans.

6) Identification and development of new cleanup and prevention techniques through a well-thought-out research and development program.

The problems of environmental compliance and restoration involve a massive effort. DoD will spend $20 to $30 billion before the turn of the century. We will develop new technologies. What we do will become a guide for the American government and industry. Eastern Europe will be using our techniques for the next half century. We will have an opportunity to plow new ground - to use our skills and education in this exciting endeavor.

The danger is not a lack of resources; it is abundance. Therefore, as we begin this massive job of cleaning up our bases, treat every nickel as if it is your own; insist on quality of planning and

execution and learn from your mistakes.

Let me close with this thought: About 10 years ago, shortly after the price of oil dropped by one-half to two-thirds and many fortunes and careers lay suffering, a bumper sticker appeared on cars in Midland, Texas. It said: "Dear Lord, please give me one more boom. This time, I won't screw it up."

Given the opportunity that has been handed to you and me, let us commit ourselves to the goal that, at the end of this century, we will each be able to look upon our work with the same sense of pride as those who prepared Americans for Desert Shield/Desert Storm.

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Supporting the Military Mission

LTG H. J. Hatch
Commander and Chief of Engineers
U.S. Army Corps of Engineers

Lieutenant General Hatch became the 47th Chief of Engineers and Commander of the U.S. Army Corps of Engineers on June 17, 1988. Corps of Engineers' missions include military construction for both the Army and Air Force, and the Army's civil water resources program which includes planning, design, construction, operation and maintenance for navigation, flood control and other purposes nationwide. The Chief of Engineers is also the senior staff engineer for the Army, supervising the Army's worldwide facilities engineering and family housing activities and providing advice on combat and topographic engineering. Additionally, the Corps has four mission-related research and development centers in the United States. Army facilities and Corps programs total over $13 billion per year.

I am privileged and honored to be a part of this important conference. And I applaud and support the **Defense and the Environment Initiative**.

As one whose agency is deeply involved in the management of natural resources, both on military installations and with the nation's water and related land resources, I can vouch for both the criticality of those resources and the importance of taking an "inclusive" approach to their protection.

Environmental programs do not succeed without community support, and we cannot exercise proper stewardship of the resources on our military installations without the concern and cooperation of all who have a stake in those facilities. This includes environmental specialists, whose expertise is necessary to those of us who make decisions affecting the environment.

Thus, a conference such as this, which brings together a cross-section of those concerned with the sustainability of the nation's natural resources, is an excellent idea, and I hope and trust it will lead to continued relationships between the various Federal agencies and with other organizations.

Secretary Cheney set the policy for DoD in October, 1989, when he said in a memo to the secretaries of the military departments that he intends the Department of Defense to be the Federal leader in environmental compliance and protection. A key element was that environmental considerations must be integrated and budgeted into the activities and operations of the departments.

The policy was endorsed in July 1990 by a joint memo of the Secretary of the Army and the Chief of Staff. The guiding principle is that work and actions must be environmentally sustainable, meeting current needs without compromising the integrity of the environment for future generations. The memo said we must integrate environmental considerations into ALL our activities, and allocate resources and train to protect our environment.

Environmentally Sustainable Development

I mentioned environmental sustainability. This is a concept of growing importance throughout the world, and one of particular interest, I might add, to the engineering profession. Let me explain.

The history of mankind has been the story of development through expansion -- progress through consumption, without significant regard for the consequences of depletion of resources.

Today, the limits of this process are within sight. The next century will see a doubling of the global population. World economic activity must expand some five- to ten-fold to sustain this population. The impact of an expansion of this magnitude on an already stressed environment could be catastrophic.

Closer to home, many communities are resisting development as a threat to the quality of their environment.

But development on the planet will, and must, continue, if for no other reason than to support the growing global population. And there are other reasons, not the least being the economic health of our own nation.

Environmentally sustainable development is a concept that is discussed extensively by scientists, policy analysts, and others around the world. And it is THE challenge to be faced by engineers, developers, environmental scientists, public officials, and individuals as we make decisions on activities impacting the environment.

It is an exciting challenge. It is do-able. And its success depends on creative, environmentally sensitive engineering.

I hold that this nation -- this planet -- cannot solve its environmental problems without the help of engineers. Not only does the work of engineers have the potential to impact markedly on the environment -- in a negative or positive way -- but engineering technology is key to solving the problems created in the past and preventing new problems in the future.

On the civil works side of the Corps of Engineers, environ- mentally sustainable development is an integral concept in planning navigation, flood control, and related projects. Any proposed development or action attempts first to avoid adverse impacts. If adverse impacts cannot be avoided, every reasonable effort is given to minimize them. Environmental aspects of a proposed project are more than a consideration; they are part of the "go/no go" test of project viability, along with economics and engineering.

Environmentally Sustainable Readiness

Just as development must be environmentally sustainable, so too must our pursuit of military readiness.

Events across the operations continuum -- from peacetime engagement through all-out war -- have considerable, if different, impacts on the environment.

Of the Department of Defense's 33 million acres, the Army alone manages 24 million acres of land and related water and air resources worldwide. That is an area almost the size of Indiana, and larger

than 12 other states. The land, water, and air at these installations must be managed so that their renewal is enhanced. Half the Army lands are under the jurisdiction of the Corps of Engineers.

A Senior Environmental Executive Council, chaired jointly by the Assistant Secretary (IL&E) and myself, was created to facilitate the exchange of ideas at the senior level.

The Army Environmental Program has four components: Stewardship, Prevention, Compliance, and Restoration.

1) **Stewardship** includes our efforts to instill an environmental ethic throughout the Army in everything it does. It involves the management of natural and cultural resources and efforts to enhance the professionalism of the environmental staff.

Until about 45 years ago, the Army's natural resources management activities consisted primarily of grounds maintenance. After the Second World War, these responsibilities were expanded to include land management, forestry, and wildlife management. As natural resources management grew, it began to support the military mission, primarily in the area of troop training. Land stabilization, beneficial ground cover, timber crops, fire protection, and the promotion of non-military use of Army lands were beginning to be realized. These included such recreational activities as hunting and fishing on Army installations. The out-leasing of lands suitable for agriculture and grazing was another non-military land use employed by our land managers.

Integrated natural resources management soon became the overriding principle we were working under, as more and more laws were enacted to satisfy public concern for better management of the lands controlled by the Army.

We also began to realize that problems associated with training lands were more serious than first thought. Overuse was destroying the soil on which Army trainers depend to meet current and future training needs.

As recently as two decades ago, natural resources had little relevance to the training mission. In fact, natural resource considerations were largely related to doctrinal requirements, such as the need for training in forests, grasslands, mountains, and valleys. And training constraints were characterized in physical terms of trafficability and mobility. At that time, terms such as wetlands, endangered species, biodiversity, excessive soil erosion, stream sedimentation, and mitigation of impacts were large unheard of. Essentially, all training lands that could be used would be used, if needed.

Today, as we all know, this is not the case. Random use of land and natural resources is no longer acceptable. If planned with care, military training can be compatible with environmental values. Before executing the training mission on an installation, natural resources must be categorized as fragile (highly erodible soils), sensitive (endangered species and wetlands) or durable (lands usable for intensive impacts). Installations should not be given missions they cannot sustain environmentally. Those training lands that receive unavoidable and inadvertent impacts must be repaired to ensure their long-term availability for future training. Adequate training facilities are critical to the Army's readiness goals.

Accomplishing the training mission on a day-to-day basis requires that the installation natural resources professional and military trainer closely coordinate and support each other's activities. Both Army trainers and natural resources managers must learn to articulate their requirements for land in terms of environmental compliance and the resources required to conduct sound land management practices.

The Army Corps of Engineers' Construction Engineering Research Laboratory has developed, and is now fielding, the Integrated Training Area Management (ITAM) Program to aid Army trainers and

natural resource professionals in the management and use of training lands. These data are especially important during rainy seasons, and even provide assistance when planning for frequency of training land use. Soil types, vegetative cover, and size and weight of equipment are a few of the factors used to make management decisions. ITAM also assists land managers to establish a resource baseline on which to determine trends resulting from military training activities and to determine the frequency of training areas use and land restoration needs.

2) **Prevention** encompasses efforts to prevent environmental degradation, with an emphasis on minimizing the creation of hazardous waste.

The Army Materiel Command is developing guidelines requiring contractors to justify hazardous material usage and to propose non-hazardous substitutes.

AMC is also establishing a National Defense Center for Environmental excellence.

And the Army is preparing a master environmental training plan to develop an environmentally aware and knowledgeable workforce. Ultimately, environmental protection rests with the individual.

3) **Compliance** covers actions to achieve and maintain compliance with all legal statutory and regulatory requirements.

This is no small thing. There are scores of such requirements affecting each installation.

The importance of personal responsibility - and liability - was driven home a few years ago with the Federal prosecution of three civilians at Aberdeen Proving Ground in connection with the storage and disposal of hazardous materials. The Army distributed to all installation commanders a videotape of the prosecutor describing the case to our worldwide conference for engineering and housing and environmental directors.

In the third quarter of FY 91, the Army had a 213 percent improvement in the resolution of notices of violations, as compared to the same period last year. Next fiscal year, the Army will begin a centrally funded $20 million program to assess compliance throughout the Army.

4) **Restoration** is the program component under which we identify, assess, and remedy contamination stemming from our past practices of disposing of hazardous and toxic substances.

Cleanup of hazardous waste is the only program in DoD that is growing in any significant amount. DoD is putting over $1 billion into environmental cleanup this year, almost double the year before. The Corps of Engineers does more than half this work. We also do the necessary environmental restoration of bases being closed.

The Army is committed to carrying out missions and activities in an environmentally sustainable manner. Compliance and sustainability are important Army goals, because, in addition to protecting the environment and natural resources, they enhance mission capabilities, strengthen community relationships, and minimize personal liability risks and long-term costs and liabilities for the Federal government. Being a good steward of the natural resources in its care is important to maintain the trust of the American people.

Environmental concern must be part of the thinking of each decision-maker. The environment must be a concern to the person planning a training exercise as well as to the Director of Engineering and Housing. And environmental impact must be a cost of operations borne by those responsible for the operations.

The Environment as a Strategic Issue

For two hundred years, the Army has been inextricably linked and woven into the fabric of our nation. Our nation expects this department to remain relevant and responsive to the needs and the demands of the American people beyond the battlefield. What we're talking about today is one of those subjects. Our public has expected us over the decades to be socially responsible, and we have responded in many ways. Our public expects us to be environmentally responsible. And at a time when the United States military is at its highest level of public confidence and acceptability in the recent history of our nation, it's an opportunity that's hard to pass up, and one that could lead the United States into a new and more enlightened era relative to, among other things, the environment.

So at the "micro" level, the Army is working to protect the environment in a myriad of ways.

But I want to take a few minutes to point in the other direction, to the "macro-cosmic" level, and look at the environment as a strategic issue.

The beginning of the end of the Cold War almost two years ago brought with it a new era of challenges for national and global security. Our national security, as well as that of other nations, is being defined less by weaponry than by establishing beneficial relationships among countries.

A spirit of community, however, can only exist in an atmosphere of economic and political stability. Unfortunately, for some nations, economic and political stability remain a goal, not reality. These countries have embedded problems that, too often, lead to conflict, both internally and with their neighbors. Environmental degradation is one of these problems.

Inadequate, unplanned development usually leads to environmental problems, often overwhelming. Many developing countries are depleting their resources and mismanaging their waste, multiplying human misery.

Environmental degradation must be placed on our national security agenda because, among other reasons, local solutions to environmental problems often will not work. Many environmental problems are not local. Acid rain, global warming, the greenhouse effect, the extinction of some animals and plants, improper handling of hazardous waste, the encroachments of deserts onto arable land, and industrial accidents may impact far beyond an individual country's borders. Witness the pollution caused by the dirty coal-fired industrial plants of what was East Germany. Witness the nuclear reactor accident at Chernobyl. Witness the oil well fires and massive oil spill in Kuwait. Witness the decline in songbirds in North America because of rainforest destruction in South America.

Environmental degradation is charged with potential for international conflict, and if that doesn't come back home to those of us in our Department, we are not thinking strategically and broadly enough beyond the bounds of our in-box and next week's training schedule.

The United States has three stated strategic objectives. They are regional stability, free-market economies, and democratic institutions. Reducing environmental degradation supports regional stability and, as such, is a legitimate component of the emerging notion within our department that we are no longer confined in our own self-image -- or the image of our leaders and decision-makers in Washington -- to a conflict spectrum.

That time is gone. We now talk in terms of the operational continuum, which goes from general war through low-intensity conflict and into peacetime engagement, which today includes the concept we call "nation assistance" - something we've done in varying forms for the last two hundred years, something we did twenty years ago when the Army Corps of Engineers was asked to go to Saudi Arabia and spend fourteen billion dollars of their money to build military infrastructure, airfields, and ports. We established some trust and relationships between the Americans and the Saudis that others tell me now provided the infrastructure that made Desert Shield/Desert Storm possible on the timeline

and at the scale that it was executed. And also made it possible for the U.S. Government to lead a coalition of allied forces onto Saudi soil, and be trusted to come in there, get the job done, and leave.

We didn't call it 'nation assistance' twenty years ago, but that's part and parcel of what you're seeking to do in our Department, not just to be "engineers." And I am not talking to just Army Engineers, but to Air Force engineers, to Navy engineers, to medics, and to logisticians.

Look at the case of Operation Provide Comfort, which supported the Kurdish refugees with facilities for their survival. I was in Kuwait City ten days ago, and a man from the United Nations was there. I think he was British. And we were talking about Desert Shield/Desert Storm, and he said, "Let me tell you the principal characteristic of Americans as viewed by many around the world." I said, "What's that?" And he said, "The principal characteristic of the United States and its fighting men and women is that they are merciful." Merciful.

For those of you within the Department of Defense, and those of you who came here thinking you were going to hear an Army three-button stand up and talk about how we can possibly get on with our training mission and still accommodate the minimum standards for environmental protection, I've sort of dashed those expectations. I'm glad -- because our Department has a much broader view of itself, has a much broader role in the fabric of our nation, and has every intention to stand up to those responsibilities and those opportunities into the next century.

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Challenges of Protecting Coastal Resources

Nancy S. Stehle
Deputy Director for Environment
Office of the Assistant Secretary of the Navy
(Installations and Environment)
U.S. Department of Defense

Ms. Stehle has been Deputy Director for Environment in the Office of the Assistant Secretary of the Navy (Installations and Environment) since 1984. In this capacity she provides policy and guidance to the Navy and Marine Corps in environmental matters including installation restoration, natural resources and land management, and historic preservation. Recent accomplishments include incorporation of no-net-loss of wetlands into Department of the Navy land management policy, and a 70% reduction of Navy plastic disposal at sea.

Navy and Marine Corps installations are located predominantly on coastal lands, and so we must constantly be sensitive to the challenges of protecting our coastal resources. In the United States, 75% of the population lives within 50 miles of the coast -- a sure indication that many Americans value life along the coast. The average population density in coastal counties in the U.S. is 343 persons per square mile, compared to 71 people per square mile in the rest of the country.

Population pressure on coastal areas will bring more pressure on our installations to protect wetlands and endangered species and to manage our land for those environmental benefits destroyed by urban development. The current pressure from Congress and the public that Federal facilities be models of environmental compliance will increase as our installations become islands surrounded by developed areas.

A good example of the kind of interest we already feel can be seen in the following quote from the Los Angeles Times magazine: "Camp Pendleton, unique for the variety of combat situations it can

simulate, is also one of the most varied wildlife refuges in southern California. Both the Marines and the naturalists appreciate what they've got here: 196 square miles of beaches and bluffs, mesas and canyons, mountains and a free-flowing river. It's the largest undeveloped chunk of coastline in southern California."

Failure to comply with environmental laws can adversely affect mission performance. As Assistant Secretary Jacqueline Schafer has repeatedly pointed out, "If we don't take care of our environment, use of that environment will be denied us, and we won't be able to perform our military mission."

From the base level to headquarters, our environmental efforts are focussed on four areas:

1) **Restoration** - fixing the problems generated years before current knowledge was gained;
2) **Compliance** - making sure we follow the current laws and regulations;
3) **Pollution** prevention - stopping pollution before it starts; and
4) **Conservation** - preserving and conserving our natural heritage.

All these efforts are interrelated in one way or another to our natural resources and the need for conservation stewardship.

Restoration refers to the cleanup of past disposal practices -- the fuel spill, the TCE, the old pesticide shop -- conta- minating the ground, and sometimes the ground water. For the Navy, the restoration process is compounded by our proximity to the coast. The Department of the Navy has 24 installations listed in the National Priority List (NPL or Superfund). Of those, 19 are on the coast -- that's about 80%. And of those 19, more than a quarter have at least one endangered species resident on the installation or in the coastal waters, or support extensive wetlands. We have several research projects on-going to determine the impact of this contamination.

Compliance with environmental laws by military installations is getting a lot of attention from Congress, the regulators and the public. Noncompliance with laws protecting these resources have been show-stoppers in some cases -- for instance, construction of base housing on wetlands at one installation was stopped for over a year. This proved to be an expensive lesson, since some of the houses ended up having to be rebuilt because of weather damage. In other cases, the presence of endangered species has limited operations in certain periods of the year or totally eliminated operations, as in the case of the California least tern in the San Diego Bay area.

In addition to the endangered species and wetland protection regulations, we must also comply with the Migratory Bird Treaty Act, the Marine Mammal Protection Act, the 1990 Amendments to the Coastal Zone Management Act (establishing state-run coastal non- point source pollution control programs) and the Legacy Program, established under the FY 91 National Defense Authorization Act.

The Navy is addressing compliance concerns through environmental compliance evaluations (ECE), which establish a framework for self-correction and ensure that our shore installations are complying with applicable Federal, state and local laws and regulations. An integral part of each phase of these evaluations is a section that addresses natural resources compliance.

To address funding for natural resources compliance, the Navy is modifying the OMB A-106 environmental compliance and funding report to include natural resources requirements. It has also established a network of state and regional environmental coordinators.

Looking to the future, it seems self-evident to many that pollution prevention is the most cost-effective strategy for natural resources protection. We're looking to design smarter, and to buy smarter.

And for today, we're implementing a program that affects us all -- recycling. Currently, more than 86% of the Navy installations have qualified recycling programs. Besides reducing the waste stream,

we can use the proceeds from recycling for other projects. Navy MWR revenues last year were $4.8 million -- enough to fund many natural resource-related outdoor recreation projects.

The Navy is also pursuing a joint effort with the American Forestry Association to promote energy conservation through strategic landscaping at military installations.

Because Navy and Marine Corps installations are located predominantly on coastal lands, we have custody of some of the nation's most sensitive and valuable ecosystems -- including the highly productive wetlands at Point Mugu and Concord, California; and areas with multiple endangered species, like San Clemente Island, California. To address the needs of these areas, we have initiated a cooperative pilot program with the Student Conservation Association, now expanded to seven installations, to train, supervise and house student volunteers assisting in the management of natural resources. We have also taken steps to protect species damaged by natural phenomena -- for instance, after Hurricane Hugo swept across North Carolina. Working with the Fish and Wildlife Service personnel, Navy foresters determined that important nesting areas of the red cockaded woodpecker had been critically damaged by the hurricane's destructive winds. We inserted 16 nesting boxes into remaining live trees, and developed "start holes" in live trees in other locations. About 50% of the boxes are now in use.

An outstanding example of endangered species management is the California least tern. We have an agreement with the Fish & Wildlife Service, under which the Navy provides a single list of in-water construction projects planned in the San Diego Bay. The Service then reviews the list for impacts on the terns, and together we plan specific management goals for the least tern nesting colonies on the three Navy bases. This provides central management of mitigation projects rather than on a piecemeal basis.

In cooperation with the U.S. Fish and Wildlife Service, a number of wildlife refuge overlays have been established to protect endangered species. This cooperative agreement protects an area, such as the wetlands at Seal Beach, California, as a wildlife refuge and provides the installation with the technical expertise of the Fish & Wildlife Service. We are also improving habitats for other species on many Navy installations.

In consonance with the President's goal of no net loss of wetlands, Assistant Secretary Schafer has established a goal to realize a net gain in wetlands by the year 2000. Last year the Navy and the Department of the Interior signed an MOA which provides for the Fish & Wildlife Service to map wetlands on Department of Navy lands using a state-of-the-art photogrammetric positioning system. This advanced approach is supplementing ongoing, conventional efforts to inventory Navy wetlands. The first phase of this initiative will provide reliable wetlands type and boundary information on 70 of our installations.

We in the Department of Defense have the opportunity to work on installations with some outstanding natural beauty. Our vision must recognize that we have a public trust in the environmental area, and that our stewardship of the environment is vitally important to the Department of Defense and to the nation.

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The Legacy Resources Program

Ms. Christina Ramsey
Principal Consultant
Applied Sciences, Inc.

Ms. Ramsey has recently joined Applied Sciences, Inc. as Principal Consultant. Previously, she was Director of the

Environmental Planning Division in the Office of the Secretary of Defense. In that position from 1982 to 1991, Ms. Ramsey developed and monitored policies for environmental planning applicable to the largest industrial complex in the U.S. -- the Department of Defense. She issued policies and procedures governing the management of wildlife, forests, agriculture and land use on Department of Defense bases, which encompass twenty-five million acres. She organized and sponsored the first DoD Natural Resources and Historic Preservation Conference.

Ms. Ramsey described the origins and initial development of the Department of Defense's Legacy Resources Management Program, including its legislative history, selection of demonstration projects and Legacy "Task" areas, and reporting requirements.

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Future Directions for DoD's Legacy Resource Management Program

Peter Boice
Deputy for Natural Resources,
Environmental Policy Division
Office of the Deputy Assistant Secretary of Defense
Chair, Defense Natural Resources Council
U.S. Department of Defense

Mr. Boice's current responsibilities include oversight of the Department of Defense's natural and cultural resources policy-related issues, including the Legacy Program. Mr. Boice has worked in the environmental field for the Department of Defense for thirteen years, including eight years for the U.S. Air Force at the installation level as base environmental coordinator and the last five years for the Office of the Secretary of Defense on policy issues.

In early August, our Legacy program managers met to discuss results of the program to date. While they were together, we asked them to reflect on the growth of the program over the past 8-10 months and to respond to several questions, including:

- What is Legacy?
- What was their vision of Legacy, into the 21st Century?
- What should be the future priorities for Legacy?

Our intent was to develop a framework around which future decisions on Legacy can be made. This presentation summarized the results of their efforts.

Legacy is:

- **Stewardship**
  - -- Something to leave for the future.
  - -- A study of resources for the public benefit.
  - -- An opportunity to protect DoD resources.
- **Concrete Results**
  - -- Results that can establish a viable scientific database.
  - -- Results that can rehabilitate or restore the environment.
- **Mission Support**
  - -- Refined management techniques -- to meet unique DoD needs.
  - -- A comprehensive internal program.

- **Integrated Program**
  - -- A hub for all existing resource management efforts, natural and cultural.
  - -- A protective program for setting priorities and allocating resources.
- **An Opportunity to Excel**
  - -- More than "just compliance."
  - -- More than inventory, although inventory is important.
  - -- More than a source for installation funding.
  - -- An opportunity to be smart and significantly increase internal and external support for our programs.
  - -- A challenge for resource managers to identify the "best" projects for future efforts.
  - -- At the cutting edge of research.

Vision Components:

- **Stewardship**
  - -- To preserve, protect and enhance resources for the future.
  - -- To establish a total DoD inventory of those resources.
- **Leadership**
  - -- To be leaders within DoD, at the "cutting edge."
  - -- To be Federal environmental leaders.
- **Education**
  - -- If we are to be leaders, we need to:
    - continue to educate our personnel and the outside community;
    - raise the level of consciousness of Legacy resources in the corporate culture;
    - instill an environmental ethic throughout DoD.
- **Facilitation**
  - -- Give tools and guidance to resource managers.
  - -- Facilitate the military mission.
  - -- Foster cooperative and systematic environmental management at all levels.
  - -- Identify organizational constraints to good stewardship.
  - -- Promote more effective use of resources.
- **Integration**
  - -- Coordinate Legacy program components with other DoD programs.
- **Creativity**
  - -- Strengthened partnerships.
  - -- Transferable technology.

Priorities for Legacy -- How do we achieve our vision?

- **Education**
  - -- Build a constituency.
  - -- Educate and sensitize top management.
  - -- Show DoD mission how important it is to "do" Legacy.
  - -- Draw together more "uniforms" -- we need top support.
  - -- Develop public awareness programs.
- **Evaluate Progress**
  - -- We need to know where we are to determine where we are going.
  - -- We'll do this through feedback and midstream corrections.
- **Ensure the Sharing of Information**
  - -- Of demonstration project results and task areas.
- **Promote an Integrated Program**
  - -- Natural and cultural resources.
  - -- Interdisciplinary integration.

* **Strengthen and Publicize Legacy Criteria and Guidelines** -- Goal: Eliminate confusion. Be expeditious.
* **Facilitate Cooperation**
  -- Encourage partnerships with others.
* **STEWARDSHIP**
  -- Underlies all else!
  -- Inventory, monitor, protect and conserve our resources.

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Forging Partnerships in the 90's and Beyond

David G. Unger
Associate Deputy Chief
Forest Service
U.S. Department of Agriculture

Mr. Unger was named Associate Deputy Chief, National Forest System, in July 1987, after serving two years as Director of Watershed and Air Management. In his current position, he oversees the work of the Range, Timber, Wildlife and Fisheries, Watershed and Air, and Land Management Planning staffs. Mr. Unger is a member of the American Forestry Association, the Society of American Foresters, and the Society for Range Management.

This year marks 100 years of conservation on the national forests. Over the last century, the National Forest System has grown to represent about 8 1/2 percent of the total U.S. land base. The nearly 200-million-acre National Forest System encompasses 156 forests and 19 grasslands. Roughly the size of Texas and Louisiana combined, these national treasures contain more than 2 million acres of lakes, ponds, and reservoirs; 128,000 miles of streams; 16,500 miles of coastline; and 32 million acres of wilderness.

Not only are national forests rich in flora and fauna, but they provide enormous economic and recreational benefits as well. Commercial fishing attributed to national forests, alone, generated more than $189 million in 1990. Each year millions of Americans visit these lands to hunt, backpack, enjoy boating and trail riding, photograph wildlife, and myriad other recreational activities. All told, these lands capture 40% of recreational use on Federal lands.

The challenges to manage and expand natural resources on national forests are real. And the Forest Service cannot do it alone. These challenges can only be met through shared investments of leadership, energy, creativity, time, and commitment from our partners in conservation.

Partnerships have become the preferred way by which the Forest Service provides better customer service. A successful partnership necessitates a mutual interest in some goal or value on the part of participating parties, as well as a need to share ownership and management of programs. Nonmonetary consideration has been the driving force for voluntary and mutually beneficial participation. Examples of what partners can accomplish on national forests range from improving trails and fishing access points to constructing nesting islands for waterfowl and planting shrubs along streambanks for fish cover and bank stabilization.

Through involvement, all individuals and groups can be brought into the realm of forest users. For it is through partnerships that citizens have the unique opportunity to participate in resource enhancement and management projects, and to see first-hand, measurable improvements to their national forest resources.

To facilitate habitat improvement on national forests and grasslands, the United States Congress established the Challenge Cost-Share Program in 1986. This unique venture, in which the State and private sectors share in both the management and cost of Federal habitat enhancement programs, has been a tremendous success.

In 1986, the Forest Service's wildlife and fisheries Challenge Cost-Share Program had 57 partnerships. Today this number exceeds 1,700! Our partners include affiliates of national conservation organizations, civic groups, corporations, scout troops, and government agencies on all levels, as well as individual citizens.

In 1986, Challenge Cost-Share dollars for habitat improvement approached $2 million. In 1990, the Forest Service and the wildlife and fisheries partners turned $9.9 million in Federal funding into $22.3 million worth of habitat improvement projects. The success of this program, early on, ignited national attention and support.

In 1988, Congress appropriated $500,000 for a Challenge Cost-Share pilot for recreation projects. Partners contributed an additional $908,000 -- nearly two matching dollars for every Federal dollar. Since 1988, the recreation Challenge Cost-Share Program has caught fire, with combined Federal dollars and partnership contributions approaching $18 million!

Recreational partnerships on national forests include an important cadre of traditional individuals and groups, including more than 2,600 outfitters and guides, more than 500 operators of lodges and marines, and some 70 concessionaires operating more than 230 campgrounds. The energy, dedication, and spirited volunteerism shown by our partners translates to a brighter outlook for forest resources and heightened recreational opportunities for all forest users.

The Forest Service and its partners are also enhancing forests and grassland habitats through national initiatives like **Get Wild**, a national program to manage wildlife habitat; **Rise to the Future**, a program to enhance fisheries habitat and recreational fishing opportunities, and **Every Species Counts**, a program to conserve and manage rare plants and animals.

Through these exciting wildlife, fish and rare plant partnerships, we completed in 1990: 15,000 habitat structures, such as nest boxes, fish ladders, and watering devices; 466,310 acres of habitat improvements; and 1,221 inventories, reports, and surveys for plants and animals.

The recipe for successful partnerships can be found in the following guidelines:

- Adopt **mutual cooperation and respect** as the standard for partnership relations;
- Replace the "agency/permittee" attitude with an **"agency/partner" relationship**. Recognize that there are no "junior partners";
- Work together to better learn about our customers and better serve their needs;
- Share the success and the struggles;
- Give each other the encouragement, flexibility, and incentive needed to unleash the creative energy required to provide quality programs;
- Recognize that you may not agree on everything .. and that that's OK;
- Provide opportunities for joint training, planning and research;
- Have fun and celebrate your accomplishments often and together;

* Keep the door open for others to join in and help.

In summary, partnerships combine Forest Service and private sector expertise and resources to provide strong, positive, customer-oriented programs. Through shared investments of leadership, creativity, time and financial commitment, partnerships provide the vital link through which all individuals and groups are brought into the realm of forest users.

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Mainstreaming Natural Resources

Gary D. Vest
Deputy Assistant Secretary
(Environment, Safety and Occupational Health)
U.S. Air Force

Mr. Vest was appointed Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, Office of the Assistant Secretary of the Air Force, Manpower, Reserve Affairs, Installations and Environment, in 1987. He establishes policy for, and oversees, worldwide Air Force environmental, occupational safety and health base comprehensive planning, natural resources, community economic impact, and interagency and intergovernmental coordination matters. He also has extensive involvement in a wide range of operational infrastructure matters such as airspace use, air-to-ground weapons ranges, munitions storage, and air base performance and operability.

Mainstreaming means we must fully integrate natural resources into the doctrine, philosophy, fabric, and culture of the DOD. This includes operations plans and all available funding programs.

- Performance is the only measure of achievement.

- Everyone must be involved and understand where they fit.

My responsibilities for the Air Force Environment, Safety, and Occupational Health (ESOH) Program include natural resources. ESOH is simply protecting and enhancing war-fighting assets. This includes people, equipment, facilities, land, air, and water so the Air Force can perform its mission.

- Access to the land, air, and water can be denied if we do not protect and enhance them through our environmental programs.

- Over 23 years ago I helped plan a 77 square mile area using the following guidelines: design with nature in mind; plan must be based on identifying, mapping, and overlaying natural resource values; use the least valuable areas for development; do not exceed carrying capacity; and minimize environmental impacts and pollution. All of this was accomplished before NEPA was enacted.

- When I came to the Air Force, natural resource issues were separate and distinct from the environmental programs. In my first assignment I built a base plan that integrated environmental issues.

The strategy of the Air Force is to integrate ESOH into everything we do. In order to do this we must identify requirements, plan, program and budget.

- Historically, natural resources has budgeted for about $7M annually. I estimate our future need

is between $50 and $75M.

- Natural resources must be part of the ESOH process. To achieve this we must plan with the Base Comprehensive Plan; include natural resources in the NEPA process; use integrated program audits like ECAMP to achieve and sustain compliance; and enlist the support and awareness from everyone associated with the Air Force to change the culture.

We must develop a strategy to integrate and mainstream the natural resource program, fight the past norm of separation and isolation, orchestrate our efforts to gain leverage to change the way we look at everything. Our strategy must be to:

- identify noncompliance,

- identify the cause of noncompliance,

- identify issues and political options to ensure compliance,

- develop and implement initiatives to integrate natural resources into the BCP, NEPA, ECAMP and environmental budget level I, II, III;

- and most importantly, program natural resource costs in the environmental budget.

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California and the Environment

The Honorable Douglas P. Wheeler
Secretary for Resources
State of California

Mr. Wheeler assumed his position as California Secretary for Resources in January, 1991, following a long career in environmental and historic preservation activities. In June, 1987, he joined The Conservation Foundation as Vice President for Land, Heritage and Wildlife; and in January 1989 was named Executive Vice President of the Foundation. From July 1985 to June, 1987, he was the Executive Director of the Sierra Club.

He joined the U.S. Department of the Interior in 1969 as a Legislative Attorney, later becoming Assistant Legislative Counsel in the Department. In 1972, he was named Deputy Assistant Secretary for Fish and Wildlife and Parks of the Interior Department, where he assisted in the formulation and administration of policies for the National Park Service, the U.S. Fish and Wildlife Service and (formerly) the Bureau of Outdoor Recreation.

Although observers speculate that public commitment to the protection of California's environment has subsided (citing defeat of ballot initiatives last fall), public opinion polls continue to reflect strong interest. Citizens do seem to reject the polarization of the past, however, and express strong preference for pragmatic, constructive solutions to environmental problems.

Towards this end, Governor Wilson has initiated a 14-point, $651 million program, "Resourceful California," which addresses many of the State's most urgent conservation priorities largely through the acquisition of threatened habitats. It is founded on principles of stewardship, partnership and sustainability. The maintenance of California's quality of life -- through protection of its rich resource base -- is essential both to livability and to economic vitality. These resources are threatened by a burgeoning population and associated development.

Because the military establishment in California is steward for so much of its natural bounty, the armed forces are appropriate partners in the conservation effort. Specifically, we propose partnerships to protect the fragile plant and animal life of the California desert at Fort Irwin, to engage in the protection of coastal sage scrub as gnatcatcher habitat at Miramar and Camp Pendleton, to assist with the clean-up of toxics at Fort Ord, and to plan for future civilian uses of the Presidio.

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Future Directions

Thomas E. Baca
Deputy Assistant Secretary (Environment)
U.S. Department of Defense

Mr. Baca assumed his duties as the Deputy Assistant Secretary of Defense (Environment) on August 1, 1990. In this position, he is responsible for the development, management, and coordination of environmental programs in the Department of Defense. He directs the Defense Environmental Restoration Program and budget to clean up hazardous waste sites on current and former DoD activities, He is also responsible for the overall coordination of the DoD natural resources conservation program and the supervision of the Armed Forces Pest Management Board.

I am delighted to be here at the Natural Resources Leadership Conference. It is indeed an honor to speak at this important event.

As I was preparing for this speech, I remembered a presentation a few weeks ago by Sergeant Major McClenahan of Parris Island. The Sergeant Major mentioned that the water and marshland surrounding the island form a natural barrier that allows Parris Island to be an environmental sanctuary.

He said there is another advantage -- it is hot, humid, and sandy; and it is filled with gnats, sand fleas, mosquitoes, snakes and alligators. A perfect habitat for training Marines.

His challenge has been to allow <u>all</u> aspects of nature to thrive and co-exist while providing Marine recruits 13 weeks of intense training.

That is the theme of this conference. The training of our armed forces and the preservation of our environment are compat- ible. Both share the ultimate goals of ensuring our well-being and preserving our quality of life. Our mission, to defend and protect our national security interest, includes environmental compliance and protection.

Because of our size and complexity, the Department of Defense has before it one of its greatest

opportunities and challenges of this decade. This challenge is best expressed by Secretary Cheney in his memorandum of October, 1989. In it he said:

"I want the Department of Defense to be the Federal leader in agency environmental compliance and protection."

Training our armed forces and preserving our environment are compatible. The management of our natural and cultural resources is an important part of this effort. You, our natural and cultural resource specialists, are important. You are part of the DoD team.

This conference is an opportunity for teamwork and leadership and to gather information to assist DoD in improving its environmental program.

Secretary Cheney said it best:

"Defense and the environment is not an either/or proposition. To choose between them is impossible in this real world of serious defense threats and genuine environmental concerns.

"The real choice is whether we are going to build a new environmental ethic into the daily business of defense - make good environmental actions a part of our working concerns, from planning to acquisitions to management."

When we speak of environmental compliance and protection, we are including all of our environmental programs. When we speak of good environmental actions, we are including natural and cultural resources. When we speak of building a new environmental ethic, we are requiring leadership, stewardship, and commitment. **This is our future direction.**

To look into the future, the Department of Defense must have a vision -- an environmental vision.

A vision is when:

"A rock pile ceases to be a rock pile the moment a single man contemplates it, bearing within him the image of a cathedral."

What is our vision? It is:

"The Department of Defense is recognized as the standard for environmental stewardship through its leadership and commitment to compliance and protection of the environment. The public widely recognizes DoD as the world leader in environmental stewardship for the twenty-first century. Our military installations are recognized by the public as trustworthy and cooperative neighbors, providing decisive and accountable solutions to environmental and public health concerns. DoD is leading the nation in generating and implementing solutions to one of the nation's most demanding problems."

For DoD to be a leader in environmental compliance and protection, we must do more than fix deficiencies found by the regulators. We must determine where the problems are, find solutions, and fix the problems. We must quickly and effectively instill meaningful environmental awareness at all levels. We must do things smarter, better and within a cost that the taxpayer is willing to support. You are an important part of that effort.

This is DoD's challenge during the decade. This is our future direction. Unless we begin to think anew, we will miss the opportunity of meeting the Secretary's commitment. We need new ideas and new approaches to solving our problems. You can help us with new ideas and approaches.

Leadership, stewardship and commitment. Three words that must apply throughout the Department. Our challenge this week is to provide leadership. Our people, whether military or civilian, must be responsible.

This responsibility requires an infusion of an environmental ethic throughout the Department. From the development of specifications to the use of the equipment, our decisions and actions determine our impact on the environment. Each individual in the Department must carefully consider these impacts before he or she acts. That's responsibility. That's leadership.

While we are solving the environmental problems today, we must strive to instill throughout the Department the conviction -- the ethic -- that the best way to handle pollution is to avoid it. We must integrate environmental considerations and responsibilities in our day-to-day operations. There is nothing we do that can't be done better. That's leadership.

Let me read to you the following:

"Department of the Air Force
Office of the Chief of Staff
April 17, 1991
Subject: Environmental Leadership

Despite steady improvements in environmental protection, the Air Force must do more, now. We must move past the study stage into the action phases -- training, prevention, and cleanup.

Specific goals follow:

- Complete cleanup of the past. Restore at least 10% of our hazardous waste sites annually with all sites completed by 2000.

- Ensure our present operations comply with all Federal, state and local environmental standards. No notices of violation is the measure of merit.

- Prevent future pollution by reducing generation of hazardous wastes to as near zero as feasible.

- Use the Environmental Impact Analysis Process to support decision-making and to protect the environment.

- Protect and enhance our natural resources including wetlands, historic sites and endangered species through sound stewardship and management.

Every member of the Air Force community is responsible for the safe, efficient use of our scarce resources in meeting the Air Force mission. Proper attention to the environment today will ensure that we can perform our mission in the future. I expect the Air Force to lead the DoD in environmental protection and compliance. Your support is essential in meeting that goal.

Signed
Merill A. McPeak
General United States Air Force"

This is not only environmental leadership, it is also uniform leadership. With this type of leadership, the Department will meet the Secretary's challenge.

While instilling the environmental ethic in the Department, we must be committed to environmental stewardship on our installations. Through careful planning and execution, we can become better

stewards of the 25 million acres of land that is entrusted to us.

Some may have the view that the Department of Defense, and military people specifically, are either ignorant of or insensitive to the environmental concerns. This is simply not true.

Military leaders are concerned with terrain, weather and sea conditions every day. Military people are exposed to a greater extent than the average American to the natural beauty of our environment. Our sailors see plastic cups, sewage and oil spills at sea; our airmen fly through smog-choked skies; and they see at firsthand the full extent of our devastated forests and rivers.

Because of our unique mission, the Department of Defense provides its military and civilian personnel the opportunity of seeing our rich and various natural and cultural resources. Where but in DoD can an airman from a city experience the pristine nature of the desert Southwest? Where but in DoD can a soldier from the Midwest experience the beauty of the mountains and forests of the Pacific Northwest?? Where but in DoD can a sailor from the southeast experience the vast expanse of our planet's oceans and seas? Where but in DoD can a marine from the northeast experience the natural habitat of the California or Carolina coast? I submit that these experiences foster stewardship. And the Department of Defense is committed to protecting our vital natural and cultural resources.

Each new or improved vehicle or training tactic makes new demands on our natural resources. Base closings and realignments will create even greater demands. We can support this mission and effort while integrating effective protection of our natural resources:

* At Fort Sill, quality training lands can be maintained while accommodating training requirements. A model renovation site has been refurbished, and all 80 training areas have been scheduled for renovation on a 10-year rotation schedule.

* At Patuxent Naval Air Station, innovative agricultural outleasing changed 120 critical airfield acres from scrub forest, reducing the potential for aircraft encounters with birds and deer.

That's leadership. That's stewardship.

The Defense Appropriations Act of 1991 established the Legacy Resource Management Program. This program provides $10 million for the preservation and conservation of the natural and cultural resources under DoD control. It is an integrated approach to manage, conserve and restore the priceless natural and cultural resources that exist on DoD lands. That's stewardship.

Because urban development frequently surrounds DoD installations, wildlife and threatened and endangered species are sometimes driven to the only remaining area that is suitable -- our isolated and undeveloped areas. We are committed to protecting wildlife and threatened and endangered species:

* At Vandenberg Air Force Base, a coastal dune management plan has been implemented with The Nature Conservancy along 55 miles of California coastline.

* At Tyndall Air Force Base, nests of the threatened Loggerhead Sea Turtles are protected.

* At Camp Pendleton, the last relatively undisturbed area on the Southern California coast has become a sanctuary for several species.

* At Fort Belvoir, they have designated Resource Protection Areas and Resource Management Areas, and expanded a wildlife refuge.

That's stewardship.

But leadership and stewardship are part of the environmental challenge. The other part is commitment. And commitment means action.

Commitment at our installations includes:

* meeting current and future environmental laws and regulations;

* implementing lasting, cost-effective cleanups at contaminated sites;

* minimizing wastes and preventing pollution;

* preserving and enhancing natural and historic resources on our installations; and

* protecting the health and safety of our people.

Commitment also means partnership. America's environment is a shared responsibility. A responsibility that has built a partnership with DoD and interested citizens, private organizations and public agencies.

Commitment and partnership mean that our installations must comply with a variety of Federal, state and local environmental laws. Because we are public servants, we must be diligent and forthright with communities and regulatory authorities.

To achieve and maintain compliance, we must be vigilant. We must move quickly to correct our problems. DoD's internal assessment programs will help in this effort. At the headquarters and installation levels, we are establishing clear accountability for environmental compliance.

You are part of this effort. You are part of our compliance program. We all have a shared responsibility to insure that our installations comply with environmental laws. It is my responsibility, it is the installation commander's responsibility, and it is also your responsibility. You are part of the team.

I challenge the participants of this conference to develop new ideas on how we can meet the Secretary's challenge of being the Federal leader in compliance and protection. I challenge the participants to certify which environmental concerns are legitimate.

At last night's banquet, Secretary McMillan challenged you to provide direction. I want to second his challenge. Our future direction lies not in more resources; rather, it is in using these resources wisely.

A couple of months ago, there was an article in the Washington Post entitled "Administrative Costs Drain Superfund." The message in the article was that nearly one-third of cleanup expenses went to program management. Not to the cleanup of toxic waste. Not to reduce the generation of hazardous waste. Not to new and better technologies. But for program management.

Our future direction and challenge is to think anew. Not in maintaining an outdated management structure of old processes and ideas. But new approaches to installation restoration. New approaches to reducing hazardous waste. New approaches to utilizing new technologies. And new approaches to preserving and protecting our natural and cultural resources. We can show leadership with new ideas and new approaches. This includes using our resources -- both people and money -- wisely.

The Department has long been viewed as a world leader in the development of new technologies. This leadership has been extended to environment.

Camp Lejeune's computer-based Land Use Management System features a Geographic Information System. This system utilizes base-specific information such as geographical, topographical,

structural, natural and environmental characteristics. It provides accurate information on many of the features of the 85,000-acre installation.

Lejeune uses this system to schedule range operations, to provide information on natural resources, and to assist in the development of construction and maintenance plans.

That's commitment to new ideas and new approaches.

Stewardship and **commitment** -- attributes necessary to instill an environmental ethic. Words that mean environmental leadership. But leadership will not happen without people. And our people are the Department's most important asset of all. Whether it is the installation commander, the environmental specialist, the natural resource specialist, the airman, the soldier, the sailor, or the marine -- environment must be the concern of everyone.

The dedication and commitment of our nearly four million employees worldwide are critical. Your dedication and commitment are critical. Strengthening our environmental ethic must start with management. This conference will help strengthen this ethic.

I applaud this conference. I applaud its theme -- Leadership. But most of all, I applaud you for your leadership, stewardship and commitment.

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Natural Resources Values in the NEPA Process

Ray Clark
Assistant for Environmental Projects
Office of the Assistant Secretary of the Army
(Installations, Logistics and Environment)
U.S. Department of Defense

Mr. Clark is the Assistant for Environmental Projects in the Office of the Assistant Secretary of the Army for Installations, Logistics and Environment in Washington, DC. He has been in that position since February 1988. As the Assistant for Environmental Projects, Mr. Clark develops policy and provides oversight for the Department of Army's implementation of the National Environmental Policy Act and Executive Order 12114. He reviews environmental impact analyses and provides mitigation recommendations to the Assistant Secretary of the Army. Mr. Clark represents the Secretariat in joint actions with other military services, the Office of the Secretary of Defense, and the President's Council on Environmental Quality.

The Department of Defense manages about 30 million acres of the public's lands in the United States. These lands are home to some of the country's most valuable archaeological sites, and to some of the most diverse plant and wildlife communities in America. Army lands alone support over 375 different endangered species.

Concern over the protection of these national assets is not new. In 1870, George Marsh, an American diplomat, wrote a book that eventually came to be named, "The Earth as Modified by Human Action." Marsh provided extensive documentation for the relatively unexplored theme that man was altering the environment in a way that would make global and often permanent changes in the balance of nature. In the preface of this book, Marsh inscribed a preacher's sermon: "Not all the winds, and storms, and earthquakes, and seas, and seasons of the world have done so much to revolutionize the earth as man, the power of an endless life, has done since the day he came forth upon it, and received

dominion over it."

I must tell you right off that I believe the lands which we have received dominion over have had earnest, capable, and caring stewardship. We have some claim already for national leadership; and other agencies should know and emulate some of what we have done. I believe we have success stories that should be told from the mountaintop, and we should be not boasting, but reporting, our success.

The DoD success is all the more significant because many of you are only the second generation natural resource managers. The lands for which we are stewards are lands that, in many cases, were eroded by winds and water; and years of neglect had degraded the land and depleted its usefulness. The Department of Defense Natural Resource Managers have brought those lands back to life, even though the military mission is one of the most destructive by nature. We have learned lessons about restoration of land that we can teach others.

But I am concerned about how we make natural resource decisions, including: making decisions that affect biological support systems off the installation; having effects that can be regional in nature; and making natural resource decisions without the benefit of public input.

More and more, the educated American public has become interested in land use decisions which affect the natural environment on DoD installations. I am concerned that the inevitable pressures on DoD lands will create more potential for conflicts with the public, as the Cold War subsides and the debate over installation reuse heats up.

The irony of that is that the Congress passed a law over 20 years ago to protect natural resources, and to provide the American public with an opportunity to participate in Federal decision-making. That law is the National Environmental Policy Act.

The NEPA has within it the values which you share. It has language that you could have written. It answers the complaint that I most often hear from natural resource managers: that you are not being heard by the decision-makers.

You are not being heard because you are not making good use of one of your most valuable allies, the National Environmental Policy Act. NEPA and natural resource protection have an inextricable and symbiotic bond. NEPA is not a documentation exercise, but a decision-making tool that natural resource managers can use to highlight the opportunities and limitations of the land base in the Department of Defense. It should be a thoughtful analysis done by people who care deeply about the outcome, not by cold, calculating contractors who are not even sure what ecosystem they are in.

NEPA requires a multi-disciplined approach to these analyses. If decision-makers begin to read and evaluate the analyses (and in the Army the Assistant Secretary reads them), and make decisions based upon the analyses (the Under Secretary of the Army does this), the EIS's will become the basis for better decisions. But more than that, there will be a brighter future for the environment and the managers of those natural resources. And we have some very real and major challenges facing us in the very near term.

Let's discuss our future for a moment. To participate in meaningful discussions for the conservation of military lands, one must first understand the assumptions upon which the Defense leadership is basing its strategies.

The current fundamental restructuring of the armed forces is going to rely as never before on the Defense Department's ability to generate the best high-technology weapons in the world, operated by the best-trained soldier in the world. "Desert Storm" displayed the results of that strategy as no briefing could. Translated for the natural resource manager, this national security strategy has at least two important elements.

- The Armed Services will field heavier, faster, longer-range weapons and combat support systems; and

- The training of these forces will involve higher intensity and more training area at a time when society is closing in on our installations, and stewardship expectations are increasing from both the public and the leadership within the Department.

All of this is happening in the face of rapid and pervasive base closures; consolidation has become a respectable term once again. As the force structure is reduced and the concomitant base structure declines, the renewed goals of the armed forces will include consolidation and streamlining. For you and me, that means more pressures on the land, air and water resources of an installation that is receiving functions from one that is closing.

The environmental impacts do not disappear; they are merely transferred to another location. The capacity of the sewage treatment plant may be taxed; the training areas may be used more often, risking faster erosion of soils and conflicts with neighbors over noise and other manifestations of training on smaller training areas. Shorter intervals between training will make recovery more difficult.

These increased uses will affect the growing numbers of endangered species on military lands. We must keep reminding our leadership that environmental constraints reduce the acreage at an installation. An acre on a map is not really an acre until you understand the nature of that acre.

Decisions about the base structure of the 21st Century are occurring now. As the Department of Defense shapes its base structure, decision-makers will be faced with numerous alternatives.

Some of the options will indeed be visionary, and may correct problems that have existed for years. Other options will crate long-term problems for the future. Many of the analysts who are creating and exploring options know little or nothing about land resources and other environmental matters. Those few of us in the building who represent your interests and your values are desperately trying to ensure that the environmental carrying capacity of our installations is not exceeded

Unfortunately, in many cases we have not invested the needed capital in identifying the baseline environmental conditions upon which to do any meaningful analysis. Even the enlightened base closure analyst who comes to us and asks for environmental information does not always get it, because we don't have it or we don't have it updated or we don't have it in a form that can be easily retrieved.

The National Environmental Policy Act should be the vehicle to highlight alternatives and help shape the future. Alternative futures are impossible to analyze if you have information on only one site. The very purpose of the National Environmental Policy Act is to encourage the productive and enjoyable harmony between man and his environment and to promote efforts which will prevent or eliminate damage to the environment and biosphere.

The foundation for natural resource protection should be the National Environmental Policy Act. And yet one of the most startling revelations we have found in the first round of base closure EIS's is that natural resource managers cannot tell us whether or not an endangered species exists on the installation. In one case, the EIS detailed an incredibly elaborate and sophisticated game management program. The EIS nearly cited the names of all the deer on the installation. Yet the installation did not know whether or not there were endangered species. How can you do day-to-day management of an installation without the basic understanding of what exists on the installation?

Now, you can say that the manager did not have the resources to do the surveys. But I submit to you that the guy who managed the game program, in this case, was in fact the guy responsible for the allocation of all the resources of the environmental and natural resource program. It was his job to allocate limited resources in an appropriate manner.

These challenges are complicated by the public's increased understanding of the values of biological diversity and their own value of nonconsumptive use of natural resources. It is another pressure you are going to feel in the coming decade.

There are currently three bills in the U.S. Congress which would amend the National Environmental Policy Act. They are
H.R. 585, S. 1278, and H.R. 1271. All three focus on natural resource protection. Both H.R. 1278 and H.R. 1271 would explicitly require the review of cumulative impacts and the global ramifications of a proposed action. It will become increasingly important to assess cumulative impacts as we continue to reduce natural resources close to their carrying capacity. To adequately determine cumulative impacts we will need better natural resources inventories and a better way to store that data.

Increased use of risk assessment integrated with life cycle environmental analysis in NEPA could significantly improve natural resource management. Risk assessment allows many environmental problems relating to a proposed action to be measured and compared in common terms, and allows different risk reduction options to be evaluated from a common base. Risk assessment allows for a systematic method of determining the impacts of a project from the cradle to the grave and allow the decision-maker to do the always-prevalent trade-offs. Fully understanding the risk to natural resources will improve the ability to reduce the risk of resource destruction.

How do I incorporate NEPA's values into my natural resource program? I have four modest proposals that will not place the DoD program in a leadership role; but they will position the DoD to move towards a leadership role:

1) Manage the **ecosystem**, not the species. Complete the natural resource inventories on your installations. Concentrate on a strategy aimed at those installations that will be receiving functions in either BRAC '91 or BRAC '93. I would also propose that the major commands participate in, and support, this effort.

2) Explore better ways to store, retrieve, and analyze this data. The Army has developed the technology and software which we are anxious to share with all the services. It is called the Geographic Resource Analysis Support System, and is the subject of workshops during this conference.

3) While you are preparing natural resource management plans, develop alternative ways of management, assess the environmental effects of all these options, and involve the public in this plan in its earliest stages of formulation. The Army requires this by policy.

4) Ensure that your leadership understands the limitations of the land before they decide to move additional forces to an installation. NEPA is the vehicle to do this; it is also a requirement of law.

In conclusion, I would offer that NEPA is a law that people like yourselves argued for in the 1960's. It is time to use NEPA to help make better decisions about the base structure of the 21st Century.

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Wetlands Mitigation

David Alan Tilton
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service

Mr. Tilton is a Fish and Wildlife Biologist in the Washington Office of the U.S. Fish and Wildlife Service.

Division of Habitat Conservation, Branch of Federal Activities. He served as Acting Chief of the Branch of Federal Activities over several months during 1990 and 1991, and presently is a staff analyst for issues associated with reauthorization of the Clean Water Act, including wetland regulation.

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include avoiding, rectifying, minimizing, reducing over time, and compensating for adverse impacts of Federal actions. As a class, wetlands are among our most important and productive habitats for fish and wildlife. Unnecessary losses should be avoided.

For many wetland types, there are numerous technical questions regarding feasibility of compensation for losses of wetland functions and values under the present state of the science. Often, wetland restoration or creation schemes have failed completely, or at least they have failed to reach the full value of the destroyed, natural wetland, which may have been thousands of years old. Therefore, sequencing (based on the Council on Environmental Quality's definition of mitigation) as described in the 1990 Memorandum of Agreement between the U.S. Army Corps of Engineers and the Environmental Protection Agency and the Fish and Wildlife Service's Mitigation Policy, provides an important series of steps to avoid unnecessary losses.

When unavoidable losses occur, mitigation goals should be a function of the relative habitat value and scarcity of the affected wetland. Restoration of wetlands through simple measures such as blocking of drainage ditches probably has the highest degree of success. Long-term monitoring of creation and restoration sites, though difficult and sometimes costly, may be the only means to ensure success and learn from past mistakes.

The benefits of mitigation measures should be available to the people that would otherwise experience negative impacts of natural resource destruction. Loss of game space along a neighborhood stream corridor, for example, is generally most appropriately mitigated within the community. Watershed boundaries form natural, biologically defensible boundaries for locating wetland restoration or creation efforts when the goal is compensation for losses in the watershed.

Mitigation banks established and responsibly overseen by private industry or government agencies offer opportunities for wetland conservation. Wetland mitigation banking consists of treating wetland impacts as debits, and wetland creation, restoration and enhancement as credits. The mitigation banks should generally be established in advance and they should be located in the watershed where permitted activities would occur. Careful monitoring, record-keeping, and standardization of mitigation measures are all important considerations for viable mitigation banks.

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Riparian Ecosystems: Critical Resources Under Russian Invasion

Fritz L. Knopf
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Dr. Knopf is the Leader, Avian Studies, at the National Ecology Research Center at Fort Collins, Colorado. He has previously worked as a research associate at the U.S. Army Research Institute of Environmental Medicine, Institute of Arctic Biology, University of Alaska, and as Assistant Professor at Oklahoma State University. Dr. Knopf is a faculty affiliate at Colorado State University, the University of Colorado, and the University of Wyoming.

Riparian ecosystems are the relatively mesic vegetative communities occurring along streamsides and in other moist-soil sites. These ecosystems provide habitats for more species of native wildlife than the surrounding uplands, despite occurring on less than 0.2% of the landscape. Virtually 80% of all birds that breed in the Rocky Mountains use riparian ecosystems; and that percentage is higher in the Southwest. Due to the linear nature of riparian ecosystems, the vegetation is used as a corridor for movements of vertebrates across landscapes.

Despite providing critical wildlife habitats, riparian ecosystems have been severely impacted by historical land-use practices such as channelization, water diversion, sand and gravel mining, cattle grazing and import of industrial waste products. These varied and almost universal demands have left resource managers with a "vigor debt" in most riparian areas. That debt occurs in the form of stressed vegetative stands that are not regenerating naturally.

Riparian ecosystems face new threats, however. Those threats come primarily in the form of exotic vegetation naturalizing along streams.

In the Southwest, salt cedar has been displacing native woody vegetation over the past 50 years. The new invasion is by Russian-olive, another weedy exotic, which is spreading rapidly west of the Mississippi River. Both of these invading species competitively displace cottonwoods and willows along streams. Such displacement transforms the multi-layered, multi-species native communities into simpler, more uniform "scrub" landscapes. The Russian-olive invasion alone produces a 30% loss of breeding bird species at any locale.

Current projections are for Russian-olive to displace 50% of all western riparian vegetation by the year 2040.

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Endangered Species Recovery

Olin E. Bray
Chief, Branch of Listing and Recovery
Region 6, U.S. Fish and Wildlife Service

Mr. Bray has worked for the U.S. Fish and Wildlife Service in the Denver Regional Office in the Federal Aid Program and the Endangered Species Program since 1978. His current position is Chief, Branch of Listing and Recovery, for the Endangered Species Program in Region 6, which encompasses four mountain States and four prairie States.

The Endangered Species Act of 1973 provides for the listing, protection, and recovery of threatened and endangered species. Section 4(f) of the Act provides for the preparation of recovery plans. All Federal Agencies that administer lands utilized by a species or that otherwise are in a position to help in the recovery of a species, should be involved in the preparation and/or review of recovery plans. Section 7(a) of the Act further states that all Federal Agencies shall utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. This means that military agencies as well as other Federal Agencies should take the initiative to implement recovery activities.

Although not required by the Act, Federal Agencies that administer large tracts of land, such as military agencies, will be best served in the long run if they manage their lands to help prevent the need for listing candidate species. This will almost always be less costly in terms of manpower and money than trying to recover a species after the status has deteriorated to the point that it qualifies as an endangered or threatened species. Examples were discussed regarding recovery accomplishments on or off military lands, as well as future opportunities for recovery activities on military lands.

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Defending Your Legacy: The Role of the National Historic Preservation Act in the Management of DoD Installations

Lee Keatinge
Historic Preservation Specialist
Advisory Council on Historic Preservation

Ms. Keatinge assumed her present position as Historic Preservation Specialist with the Advisory Council on Historic Preservation in Denver, Colorado, in 1986. A lawyer and architectural consultant, she was in private practice specializing in conservation architecture from 1984-86. In 1982 she was the Historic Architect for the Colorado Historical Society.

The National Historic Preservation Act (NHPA) sets out a general policy which encourages the preservation of prehistoric and historic properties by Federal agencies, including the Department of Defense, for present and future generations. The Act has four major components which:

1) authorize the Secretary of the Interior to expand and maintain the National Register of Historic Places;

2) encourage States and local preservation programs and provides for the designation of a State Historic Preservation Officer (SHPO) in each state to identify and inventory historic properties, nominate eligible properties to the National Register, prepare and implement a statewide historic preservation plan, act as an intermediary with Federal agencies on historic preservation matters, and provide public information and technical assistance;

3) uthorize a grant program which gives funds to the States for historic preservation projects and can give financial assistance to individuals to preserve properties included in the National Register; and

4) establishes the Advisory Council on Historic Preservation, an independent Federal agency, which is directed to advise the President, Congress, and other Federal agencies on historic preservation matters, conduct educational programs, encourage public interest in preservation, and implement Section 106 of the Act.

Section 106 directs Federal agencies to take into account the effect of their undertakings on historic properties, and to afford the Council a reasonable opportunity to comment on the agencies' undertakings.

The regulatory process which provides a framework for this mandate is set out at 36 CFR Part 800. This regulation creates a partnership among the Federal agency, the SHPO, and the Council and encourages the involvement of other interested parties in the planning of undertakings which may affect a historic property. Its goal is to accommodate historic preservation concerns with the needs of Federal undertakings, to identify potential conflicts between the two, and to help resolve such conflicts in the public interest.

The regulation does not contain any measurable standards; rather, it promotes consultation and cooperation by the parties in the early stages of planning. The Council encourages agencies to integrate the Section 106 process into their normal administrative process for project planning to ensure the early, systematic consideration of historic preservation issues.

Although 36 CFR Part 800 will generally govern the review process required under Section 106, it does permit the Federal agency, SHPO, and Council to consult to develop a Programmatic Agreement for a particular program, complex project, or class of undertakings as a substitute for the usual regulatory process.

Another key section within the Historic Preservation Act was added in 1980 when Congress codified the provisions of Executive Order No. 11593 into Section 110. This provision establishes procedures for Federal agencies in their management of Federally owned or controlled property, requires the agency to locate and inventory historic properties within their control, and exercise caution to protect all such historic properties. Section 110(f) requires Federal agencies to undertake such planning and actions as may be necessary to minimize harm to a National Historic Landmark and obtain the Council's comment on the undertaking.

Other Federal statutory authorities that include the preservation of historic properties among their purposes and goals are the National Environmental Policy Act, the Department of Transportation Act and other related statutes, the Historic and Archeological Data Preservation Act, the Archeological Resources Protection Act, and the Federal Land Policy and Management Act. While the goals of these Acts are generally complementary to the NHPA, compliance solely with these Acts does not fulfill a Federal agency's responsibilities under the NHPA.

The Council has recently entered into an exciting partnership with the Department of Defense in the development of the Legacy Resource Management Program. We will assist DoD in the evaluating programs related to cultural and historic resource protection, proposing improvements to these programs, and developing additional initiatives to protect historic properties. This Program should result in new approaches to the management of the many significant historic properties controlled by DoD, and should provide enhanced opportunities for their public access and appreciation.

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Joint Use and Land Management Planning

James Colby
Senior Planner
Bureau of Land Management

Mr. Colby has been a planner at the Bureau of Land Management since 1977, and now holds the title of Senior Planner. Prior to joining BLM, he worked with several public planning agencies, including multi-county-wide bodies. In his present position, he coordinates planning of BLM with other Federal, state and local agencies and Indian tribes. He specializes in the evaluation and designation of areas needing special management.

The BLM and the U.S. Forest Service (FS) are the preeminent land managers in the United States, responsible for 461 million acres of Federal lands. These lands are managed according to the principles of sustained yield (non-depletion of renewable biological resources) and multiple use (a diversity of uses according to needs and capabilities). By Federal statute, the BLM and the FS determine resource condition objectives, allowable uses, and management practices through land use planning. Plans are developed by the administering field office for territorie under its jurisdiction.

The preparation and approval of the land use plan is a major Federal action significantly affecting the human environment. An environmental impact statement is prepared with each plan. When completed, the resulting plan and NEPA base are binding upon management decisions. They also provide a plan and NEPA base for further more detailed and site-specific analyses.

The planning process is the principal means for public involvement in land use decisions and the enabling coordination with other Federal agencies, including the Military Services, and with State and local governments and Indian tribes. The planning process is established in Federal regulation and has proven to be sound and effective. The BLM and the FS are prepared to provide training and technical assistance to the Military Services as they become more involved in resource management planning. Military Services can benefit from BLM and FS planning experience. It is likely that there will be increased opportunities for joint planning in the future.

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Inter-agency Processes for Military Use of Bureau of Land Management and National Forest System Lands

Dr. Pamela Case
Regional Environmental Coordinator
Rocky Mountain Region
U.S. Forest Service
U.S. Department of Agriculture

Dr. Case has been the Regional Environmental Coordinator for the Rocky Mountain Region of the U.S. Department of Agriculture's Forest Service for the past five years. She is responsible for all environmental coordination activities in the Rocky Mountain Region. These include ensuring compliance with all Federal environmental protection laws and ensuring that Forest Service personnel are knowledgeable and skilled in environmental analysis. Dr. Case also provides technical support to Forest Service offices; develops strategies, compliance techniques and methods for resolving new environmental issues or conflicting requirements; and maintains a program of review and program administration.

Jim Colby and Pamela Case jointly presented a discussion of joint use and land management planning. Dr. Case's portion of the discussion focussed on inter-agency processes for making military uses of Bureau of Land Management and National Forest System lands. The discussion described current and anticipated future military uses of these lands: cooperative opportunities and land use conflicts. Dr. Case explained three devices for coordination - long-term planning, special use authorizations, and memorandums of understanding - and their most appropriate uses. She also described the processes through which citizens can appeal military uses of these Federal lands, and how the two agencies (BLM and FS) attempt to deal with these appeals and litigation.

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Geographic Information System Overview: Potentials and Pitfalls

Colonel L. G. "Sam" Thompson
Associate Dean for Academic Research
United States Military Academy
West Point, New York

Col. Thompson is currently a Permanent Associate Professor with the Department of Geography and Environmental Engineering at the United States Military Academy, West Point, NY. Col. Thompson, while on sabbatical leave from the Military Academy, just completed one year of service as the Geographic Information System Coordinator for the U.S. Army Corps of Engineers. His mission there was to facilitate the implementation of geographic

information systems in the Corps. Col. Thompson has managed the Academy's Mapping, Charting, and Geodesy Program while teaching or supervising eight courses in the fields of Geographic Information Systems, Remote Sensing, Photogrammetry, Computer Assisted Cartography and Surveying.

Introduction

A geographic information system (GIS) is defined as a hardware/software system which permits the input, storage, retrieval, manipulation, analysis and display of spatial data. The most important term in the definition is "analysis." It is the ability to analyze data that truly differentiates a GIS from image display devices or the well-established computer-aided design and drafting (CADD) technology.

The term "spatial data" that appears in the definition gives a clue as to which organizations could be expected to advantageously utilize a GIS. "Spatial" refers to data that have location, i.e., an X, Y & Z or latitude, longitude, and elevation. It is the requirement for location that differentiates a GIS from an MIS (management information system).

Although GIS technology germinated in the early '60s, it has been only recently that the systems have become widely utilized. A partial explanation is that the supporting cast of disciplines for GIS's have only recently matured. GIS's are a combination of several technologies (remote sensing, computer-assisted cartography, image processing, database management, photogrammetry, et al.) and vast improvements have been realized in each of these technical areas in the last few years. Four additional factors contribute to the GIS explosion: the demand for thematic maps is acute; the supply of data is plentiful (satellite imagery, etc.); computers have become relatively inexpensive and commonplace; and the mathematical algorithms have been developed to handle the computations.

Funding constraints, greater environmental/resource awareness, and the demand to hold someone accountable for environmental abuses have led organization managers to the realization that they simply cannot respond to the battery of queries being fired at them by using outdated techniques. Congressional leaders, senior commanders, regulating agencies, and others want answers today, not six months from now. Organizations that fail to participate in the GIS revolution will increasingly find themselves not relevant to the important issues of today and will suffer under a budget that reflects that irrelevancy.

GIS vs. CADD

The single greatest difference between a CADD and a GIS is that a CADD does not have the capability to "analyze." For example, you may expect your CADD to display all the secondary roads and telephones in your area -- and this it can do. However, let us assume that you will be letting a contract to widen the secondary roads in your area and wish to know how many telephone poles will have to be moved (i.e. are closer than, say, 20 feet to the road). A CADD cannot answer this question, while a GIS can do this and more.

The real-world problem of locating a suitable area upon which to spread sludge from a waste treatment plant in an attempt to convert it back to topsoil, vs. just dumping it in a landfill, illustrated this point nicely.

Twelve criteria are listed.

1. Land is less than 50 acres
2. Land has a greater than 8% slope
3. Land is not forested
4. Land is not marshy or in flood plain
5. Land is more than 200 feet from all surface water

6. Land has ground water table more than two feet deep
7. Land permits restricted access for 12 months
8. There are no future land use plans for the tract
9. Land has surface permeability between 0.6 and 6.0 in/hr
10. Land can be easily accessed by roads
11. Land is more than 100 feet from installation boundary
12. Land has bedrock at a depth greater than two feet

Given a properly prepared database, this nearly impossible problem without a GIS is reduced to a simple exercise with a GIS. Furthermore, the ease and flexibility of the system invites managerial "what if?" queries. Immediate responses to well-conceived "what if?" questions enable the manager to iterate to the truly "best" solution to a problem.

Several popular CADD manufacturers have injected the appropriate intelligence into their CADD's to raise them to a new plateau called a "vector GIS." The intelligence being instilled is called "topology", which is defined as a measure of connectivity, i.e. it is when the telephone pole (or any feature) knows who its neighbors are, thus permitting an analysis of the data.

Why Not a GIS?

Given the list of advantages of a GIS, including:

- Improved quality of information
- Increased productivity
- Reduction of costs
- Improved decision-making
- Improved information flow, and
- Improved timeliness of information

it would seem that all organizations must be developing plans for full implementation. However, this is not the case. Admittedly, change takes time, and there is a substantial cost involved. However, the most important reason why more organizations are not implementing a GIS is that people feel threatened by them. They fear that organizational changes will be forthcoming and suspect that this will result in their having less power and influence. This underscores the need for the appointment of a GIS coordinator, which will be discussed later.

The Raster-Vector Pitfall

In general terms, a GIS may be applied to problems in design, facilities management, and resource management. Design is self-explanatory. Facilities management is concerned with utility lines, streets, manhole covers, sewage lines, etc. The features being mapped are often linear and not large. Resource management is defined as managing "areas", i.e. wetlands, environmentally sensitive areas, habitats, forests, etc.

Vector systems, as the name implies, map the real world in terms of straight line segments. (Computers do not draw curves, but a series of very small straight lines) A line segment is defined by its starting and ending points. The database then is composed of a series of starting and ending points with instructions for the output device (probably a mechanical plotter) to travel to the next location with the pen up or down.

Raster GIS's divide the real world into small cells, pixels, or squares. For example, to make a landcover database of Ohio one would symbolically place a transparent grid over all of Ohio, then determine the predominate landcover class for each cell. The database then would be a grid of whole numbers with each number representing a distinct landcover within its particular cell.

It should be noted that topological database compilation is considerably more complicated than what is being indicated here. But for tutorial purposes, the basic difference between vector and raster data is as stated. The conclusion of this brief, simplistic explanation is that, if you are dealing with facilities, then you will require a vector GIS. Those concerned with resource management could use a raster system. Although there are subtle advantages and disadvantages to each type of system, the fact remains that vector systems may be used for all applications (design, facilities and resource management) while raster systems are limited to resource management because of their unique data structure.

A GIS Champion

It is widely accepted that GIS implementation will not be possible without first appointing a GIS Coordinator. Someone who understands the technology and its many applications needs to be designated as the overall project manager for implementation. Literally all large government organizations have such a position. The U.S. Army Corps of Engineers decided to call their "champion" the Spatial Data Systems Manager, but the intent is the same -- a person identified as being responsible for the efficient introduction, coordination, and use of GIS's.

This individual will be called upon to "sell" the concept to most organization managers and employees. This marketing must be done in such a way that everyone sees him- or herself as a winner, i.e. they can imagine their tasks being done more quickly, accurately, and efficiently which will mean greater influence for themselves.

One of the primary tasks of the GIS Coordinator will be to gain management support. All GIS textbooks explain that GIS implementation is not a grassroots movement; it is a management decision which will have a profound effect on the organization.

The Corporate Database

The GIS Coordinator must promote the idea of the corporate database. This concept has its foundation in the simple truth that, for government agencies, the data with which they deal really belongs to the taxpayer. Maybe one could say it belongs to the agency head, but certainly each individual division or branch does not own any data. This point is not always easy to make; people work hard to gather data, and a proprietary feeling soon develops.

The trouble with disparate data ownership is that it is inherently inefficient, costly, and counter-productive. The idea must be promoted that all spatial data should be held in one central location (one database) where everyone may read any layer, but only one designated individual (or groups) may write to any one layer.

The benefits become obvious. Assume a flood control structure needs to be constructed. The engineers could query all of the layers in the one centralized database to locate the desired soil type, ownership, elevation, slope, landcover, etc. More importantly, areas to be avoided such as wetlands, areas containing hazardous waste, environmentally sensitive areas, etc. could be identified.

Data acquisition becomes a more orderly and cost-effective process when the corporate database concept is employed. When funds need to be expended to gather a particular type of data (e.g. planimetric features) at very little additional cost, the vegetative layer, hydrographic layer, etc. could also be gathered. Instead of paying for aerial photography and the very costly model set-up two or more times, a coordinated data acquisition effort will ensure that managers are aware of, and are able to respond to, the data requirements of the entire organization.

Professor James Clapp, of the University of Wisconsin, tells the story of how one county in Wisconsin was flown five times in one year by government agencies. At one time, there were two aircraft buffeting for airspace in their gusto to gather aerial photography. Centralized databases

managed by a representative committee of all the users would prevent such unnecessary waste.

Plan for Database Compilation and Maintenance

If your organization has adequate manpower to compile your own database, then you are terribly overstaffed! For most government agencies, this is not the case. It is simply not possible to continue to perform one's normal mission and still prepare a database for future use. The answer is to contract with one of the many companies which make their living by rapidly and efficiently compiling databases.

However, the potential GIS user must also plan for the maintenance of this data. Electronic databases become obsolete just as rapidly as analogue databases (paper maps). Small installations would be better off contracting for both the preparation and the continued maintenance of their database. Larger organizations may cost-effectively maintain their own database once a system is established for the reporting and logging in of changes.

Can One Database Do It All?

GIS managers are tempted to reason that, since their organization performs design, facilities management, and resource management, surely one database could do it all. After all, is it not true that the only real difference in these three spatial applications is one of scale?

The reality is that while scale is the only true difference among these three applications and technically 32 bit computers could handle it, the sheer volume of data would preclude its practice. Arlington County, Virginia examined this very problem. Their consultant arrived at the conclusion above: separate your design and management databases.

Getting Started

Implementation menus are commonplace. Invariably first on the list is a plea to determine what you do and to identify what data is required to permit you to do it. Even then, prototyping is highly encouraged, for rare is the database that is perfect', designed on the first try.

Probably the most important tip for potential GIS users is to seek help. The cost of a consultant to properly assemble a hardware/software system with an appropriately designed database is typically well worth the expenditure.

Conclusion

Geographic information systems reflect a technology whose time has arrived. Organizations that routinely deal with spatial data will find an ever-increasing need to adopt one of the several quality decision support systems on the market. Higher management must fully support the decision to introduce GIS's into their organization, middle management must be trained as to their usefullness and application; and the user will require extensive motivation and training. The result of a well-orchestrated implementation will be higher productivity, greater responsiveness, better decisions, and a lower cost for the taxpayer.

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GIS Applications at Fort Hood, Texas

Emmett Gray
Supervisory General Engineer
Chief, Environmental Management Office
Directorate of Engineering & Housing
Fort Hood, Texas

Mr. Gray has been Chief of the Environmental Management Office at Fort Hood since 1981. His current responsibilities include air and water pollution abatement; hazardous waste management; noise pollution abatement; energy conservation; fish and wildlife activities; endangered species management; archaeological and historic preservation; natural resource management; a soils conservation program; an entomology program; a recycling program; and utility sales and purchases.

1. Background

Fort Hood embraced GIS technology early on in the game. In 1982, Fort Hood sponsored the U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (CERL) to create what was then known as the Fort Hood Information System (FHIS). This suite of computer programs later became the Geographic Resources Analysis Support System (GRASS).

2. Introduction to GIS Technology

A GIS (Geographic Information System) functions similarly to dBase, except that all the data are associated with points on the ground. Instead of data base "fields", a GIS has "map layers."

There are two basic types of GIS's in the world. A raster-based GIS uses rows and columns, and is similar to Lotus. Like Lotus, it is best suited for performing calculations. Vector-based GIS's use lines and points, and are similar to AutoCad.

There are several commercial GIS products available, and at least two "public domain" products.

Remote sensing is closely related to GIS technology. Remote sensing means gathering data by instrumentation from locations that are too hazardous, too expensive, or otherwise impractical. Landsat satellite images are classic examples of remote sensing. Landsat images can be used with a GIS to examine vegetation trends over a 20-year period.

A Global Positioning System (GPS) is another technology that is often used with a GIS. GPS's are typically hand-held units that determine Latitude and Longitude (or UTM's) by triangulating on satellite signals. A GPS is very useful for measuring the perimeter of a pond, or locating transect lines.

3. CERL's GRASS v4.0

GRASS is a raster-based GIS, but with many vector capabilities. GRASS is copyrighted, but is in the "public domain". This means that GRASS is cheap and comes with source code. CERL has a GRASS support organization to deal with users' questions.

GRASS takes a "big box" to run and requires the Unix operating system. The minimal hardware requirements are about $20K.

4. Is a GIS right for you?

Staffing is the most critical part of implementing a GIS at your installation. Any GIS will require at least one person with a strong computer aptitude. Unix operating system experience is a strong plus. Training is absolutely required to prevent the system from atrophy.

The question of the need for a dedicated GIS operation and/or a computer programmer is a hotly debated issue. The answer is based on your applications.

5. Types of GIS applications

There are only five types of GIS applications:

- Research
- Site selection or site avoidance
- Event tracking (e.g. locations of fires)
- NEPA documentation
- Management of natural resources

A GIS is just another "tool in the toolbox". It can't solve any of your problems for you...it only helps you solve your own problems.

Since your expectations tend to be higher when using a GIS, the true measure of productivity is not how much money or time you've saved, but how much better is your product.

6. Application examples

- Site selection for sanitary landfill
- Digging permits (site avoidance)
- NEPA documentation
- Maneuver Activity Damage Assessment Model (MADAM)
- Defending NEPA in court
- Preparation of Integrated Natural Resource Management Plan
- Historic Preservation Plan
- Range Scheduling

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Concurrent Speakers:

Track A

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Tracked Vehicle Environmental Impact - An Overview

Dr. Thomas Thurow
Texas A&M University

Military training activities using tracked vehicles are an intensive land use that has the potential to adversely affect the environment. Tracked vehicles crush the existing vegetation and compact the soil. These perturbations result in increased exposure of the soil to the erosive forces of raindrop impact and wind. The collapsed soil pores make it more difficult for water to enter the soil, thus increasing runoff and sediment transport, which may result in severe gullying, flooding and sedimentation of waterways. The altered hydrologic condition of the site contributes to the creation of a harsher microenvironment which may inhibit the rate of vegetation reestablishment and/or cause an undesirable shift in species composition (which may, for example, decrease grazing value or increase fire hazard). The hydrologic and vegetation impacts of tracked vehicles may therefore impair the utility of the site for future military training and may reduce land productivity.

In some regions, management of the timing, intensity and frequency of training can substantially limit environmental impact. In other locales, fragile ecosystems can be disrupted for decades by a single pass of a tracked vehicle. The degree of environmental impact and the rate of recovery associated with tracked vehicle activity are dependent on a host of site characteristics such as soil texture, soil moisture when the activity occurred, seasonal patterns of precipitation and temperature, vegetation type, etc. The interrelationships between these site variables and the resultant environmental impact of tracked vehicle activity are poorly understood. Managers must understand these interrelationships to make informed decisions regarding the anticipated environmental impacts of tracked vehicle training.

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Tracked Vehicle Training Considerations

Karla Swanson
Area Manager, Barstow Resource Area
Bureau of Land Management
U.S. Department of the Interior

Operational needs must be well-defined so that we can identify and implement adequate and appropriate NEPA analyses, facilitate development of mitigation and resource avoidance measures, and determine necessary and reasonable constraints on training activities.

Questions to be asked of Operations should include: the type and number of vehicles; the time, number and duration of events; the type of use -- whether terrestrial or aerial; and what peripheral or adjunct activities or facilities will be required (e.g., radio transmitters, close air support, fuel bladders, or bivouac areas).

It's most helpful if Operational Specialists can regularly work with NEPA or Resource Specialists to coordinate their efforts. Communication is the key -- if we cannot communicate, then we cannot hope to understand each other's needs.

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Interagency Land Use - Tracked Vehicle Training

Col. Hal Fuller
Garrison Commander
Fort Irwin, California

We regret that no abstract of Col. Fuller's remarks is available.

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The Effects of Tracked Vehicle Training on Wildlife Habitat

Mark Hilliard
Watchable Wildlife Program Manager
Bureau of Land Management
U.S. Department of the Interior

The Orchard Training Area (OTA) is part of the Snake River Birds of Prey Area (SRBOPA), which supports North America's densest nesting population of raptors. Military use of the OTA, authorized through a Memorandum of Understanding between BLM and the Idaho Army National Guard (IDARNG), is subject to periodic review and is highly visible to the public. Public lands are managed for multiple uses and, in the SRBOPA, military training must be managed for consistency with maintaining prey habitat and other values. Though the physical impacts of tracked vehicles on habitat are easily described, their significance to wildlife is often unknown and confounded by livestock grazing impacts and escalating wildfire problems. A BLM/IDARNG research project is underway to develop a system to quantify training impacts on habitats in the SRBOPA.

NEPA requires opportunities for public participation in land management decisions, precluding instant environmental decisions that military officers could otherwise make on lands dedicated exclusively to military purposes. Compliance mandates clear and frequent BLM/IDARNG communications to protect both public land resources and continued IDARNG access to the OTA.

We are combating radical habitat changes caused by fires in the SRBOPA. Cooperative initiatives in wildfire suppression, training modifications to reduce impacts to soil and vegetation, habitat restoration, and troop environmental awareness underscore BLM/IDARNG concerns for its protection. In this and other desert environments of the northern Great Basin and Columbia Plateau, the true impacts from today's management actions may not be realized for 100 or more years. Consequently, shorter planning horizons are functionally inappropriate for some environmental analyses and attendant decisions.

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Interagency Land Use - Tracked Vehicle Training

Thomas Warren
Director, Environment and Natural Resource Division
Fort Carson, Colorado

* Begin with a basic management philosophy. The Training Mission is not "inviolable." It is not sacred in the required intent. We do not have to destroy in order to effect maximum training benefit. In fact, I would assert to you that if we do destroy our resources in the course of "accomplishing a training mission", the net result is tantamount to failure -- for in the future we will no longer be able to train, and therefore continue to provide for tactical readiness, combat effectiveness and survivability on the battlefield.

* Our environmental and natural resources, of which I would make no inherent distinction, are the very basis upon which our training mission and all allied support facilities (which include personnel and the very installation infrastructure itself), are founded. For without the continued, stable availability of those resources, there can be no training mission -- either now or in the future.

* With this philosophy in mind, the question and opportunity becomes, how do we proceed to accomplish our various responsibilities associated with providing for the continued conservation of the resource and, hence, for our training mission availabilities?

* Irrespective of our individual management disciplines, initiatives or intentions, I would propose that our initial focus should be one of mutually beneficial education, for both managers, and the trainers. I believe that through understanding of the requirements of all parties, our individual responsi- bilities can and will be accomplished in potential perpetuity. Additionally, as this mutual respect becomes increasingly solidified through continuous communication and negotiation, we realize other benefits to include:

-- Support (Part of the team)
-- Resource Conservation and Continued Mission Accomplishment
-- Fiscal savings (Decreased Degradation)
-- Public acceptance of our stewardship and hence renewed compliance from the user
-- Political affinity and consideration in the future

* Nothing we do is easy. In a military system, which is constantly moving and changing, the redundancy of the requirement to educate can become frustrating. But how else can we as managers -- and, more importantly, the resources for which we have responsibility -- survive and continue to remain available for future training mission utility?

* Change is slow, but it does occur, as we have heard many times during this conference. With continued assistance and refinement of our management programs, backed up by consistent and relentless efforts, we all benefit.

* These same principles apply to our interaction with other agencies, both at state and Federal levels. In general, the Department of Defense in the past was hesitant to develop our obvious leadership role in resource conservation. Far too often, due to our considered position of authority, we demanded conformity with our requirements rather than employing consideration and negotiation on how best to accomplish our agency mutual and specific responsibilities. However, with the advent of pertinent environmental legislation (principally NEPA, ESA, ARPA, CWA, and CAA), and the publication of a renewed environmental stewardship ethic from the highest level of our Department, we have renewed and affirmed our position as a true Federal leader of in the realm of resource stewardship.

* Because of our demonstrated willingness to communicate and the documented success of our resource conservation efforts, other agencies are now more often inclined to discuss, consider and implement interagency agreements whereby the DoD can and has expanded training opportunities to other lands and to other diversified resources with increased training benefit.

* DoD utilization of resources under the administrative control of both the BLM and Forest Service throughout the United States attest to this fact. Dialogue at all levels, from the Secretariat to the installation resources manager, have facilitated this utilization. But continuation of these opportunities has as its basis our ability to accomplish the training mission in concert with and not to the detriment of the resource base, both internal and external to installation boundaries.

* The vast majority of our tactical military missions are inherently destructive in intent. However, I would assert that our training cannot be significantly and irretrievably destructive if we are to realize the continued opportunity to accomplish that training. This is not to say that some resource impacts or even loss is unacceptable. For that is unrealistic, if not grossly naive. Nowhere is this more

evident than in the accomplishment of mechanized vehicular training. In order to train as you will fight, so that you can survive on the modern battlefield, we must utilize the resource. But that utilization can and is being accomplished on vast areas, both in this country and abroad, without serious resource degradation. In many locations, depending on your individual management orientation, it can be accomplished with beneficial results to the resource base.

* We have at our disposal various management improvement tools such as GIS, ITAM and LCTA which can and have facilitated beneficial utilization and continued conservation of the resources. But, and as I originally stated, each of those are only as beneficial as our individual abilities to communicate, educate and negotiate relative to our mutual mission accomplishment.

* Through these efforts we each -- irrespective of agency affiliation or responsibility -- can continue to provide for sustained military preparedness and the resource conservation upon which the former is inherently dependent.

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Recovery of Arid Lands Used for Armored Maneuvers and Ancillary Developments

Dr. Howard Wilshire
Geologist
U.S. Geological Survey
Menlo Park, California

Studies were conducted to assess the degree of recovery of soils and vegetation in parts of the Mojave Desert used for armored maneuvers in 1942-44 and 1964. Eleven and one-half millions acres were used in 1942-44 by over a million troops stationed at twelve base camps. About 400,000 acres of the same land was used in the 1964 Operation Desert Strike. Three separate types of disturbance in the 1942-44 campsites were examined -- tent sites, parking lots, and roads -- in order of increased severity of impact. With the exception of tent sites and parking lots at one site, soils in all areas studied remain highly compacted, plant communities have lower cover and species compositions are skewed toward short-lived species compared to controls.

Studies of side-by-side tracks left by single passes of tanks in both 1942-44 and 1964 maneuvers show that soils remain compacted. Compaction in 1964 tracks is slightly less than in 1942-44 tracks, but the area of surface disturbed/mile of track is much larger. Biomass and ground cover of annual plants in tracks of both ages are lower compared to undisturbed areas, and plant species assemblages in and out of tracks differ.

Three 25-mile long lines of strafing runs were constructed in 1942-44, they retain severely disturbed surface conditions and incomplete plant recovery despite the shallowness of the cuts.

Among the combined effects of these disturbances, including even the lightest impacts, are:

1) long-term degradation of vegetation and habitat;
2) reduced soil moisture and infiltration rates;
3) increases in runoff, surface reflectivity, soil and near-surface air diurnal temperature ranges; and
4) accelerated wind and water erosion. Such effects are important contributors to desertification, a global environmental problem.

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Interagency Land Use - Airspace Management and Air Operations

Brian Dean
Aviation Safety Manager
Bureau of Land Management
U.S. Department of the Interior

The natural resources management agencies -- Federal, state, local and private -- have two common concerns with airspace. First, they are concerned about the effects of aircraft overflights on the environment -- specifically, the effects of aircraft noise, pollutants, and intrusion on wildlife, habitat, and human visitors. Secondly, they are concerned with the use of low-altitude aircraft (a common tool in natural resources management) and the increasingly crowded airspace in those lower altitudes, which present the threat of airspace conflict and mid-air collision.

Five years ago, we had very little hard data on the effects of aircraft on the environment. Those data which did exist resulted from studies which were species-specific or localized geographically. That situation is rapidly changing with the new-found cooperation among the Department of Defense and the natural resources managers.

Congress has charged the National Park Service and the U.S. Forest Service to conduct a wide-ranging study of the effects of aircraft overflight on specific, sensitive natural resource areas, to report the results, and to recommend minimum overflight altitudes or other mitigating measures. The results of that study and recommendations will have a far-reaching impact on future rules, laws, and aircraft operations over non-urban areas. DoD is a major participant in that study, and this typifies what I see occurring in many places. There is a new attitude of cooperation and a sincere desire to assure environmental integrity.

Natural resources pilots have one of the toughest flying jobs in the world. Virtually all of their work is conducted in very close proximity to the terrain or in extreme weather. Our greatest concern is in the low-altitude structure, where traffic density has become a problem. Each year we experience near mid-air collisions with other aircraft; last year, the Department of the Interior alone had eleven near mid-air's.

There is great demand for use of the low level airspace. These are the altitudes where much of the military tactical training must occur. They are the same altitudes where small, civilian aircraft often navigate; where we conduct wildlife surveys, animal capture and control flights; where law enforcement agencies must fly; and where aerial firefighting is done.

In 1986, some natural resource pilots in the Department of the Interior met to discuss the possibility of effecting better airspace coordination and ways to reduce airspace conflict. Individually, we were not having much success in getting the attention of the other airspace users or of the FAA. No one of us could describe the scope of the problem nor propose solutions acceptable to everyone. We queried other natural resources management agencies and confirmed that environmental impact and aviation safety were our mutual concern in the lower altitudes.

Under the sponsorship of the Office of Aircraft Services, Office of the Secretary, Department of the Interior, we formed the National Airspace Committee to represent our common interest in airspace management. That committee, comprised of one representative from each of the DoI bureaus and one from our principal cooperator, the U.S. Forest Service, has been successful in gaining recognition of the concerns, and acceptance of cooperative solutions. Where the issue is environmental impact, we work closely with the environmental coordinators and with special interests. Where the issue is airspace conflict, we are pleased to report a new era of cooperation among ourselves, the FAA and the military services.

We recently completed a two-and-a-half-year effort to standardize and publish the procedures which have led to this cooperation. The result is titled the InterAgency Airspace Coordination Guide and is published by the Department of the Interior and the Department of Agriculture. The composition, writing and editing of this best-seller was a joint effort of DoI, FAA, and DoD. The Guide is internal instruction for DoI and Agriculture employees and information for others. It fully accommodates FAA procedures but augments them with actions necessary to deconflict the airspace, especially in rapid response, emergency operations. We have extensively tested the recommended procedures, and they work!

If you are concerned with airspace, I encourage you to look at this document so that you can know what to expect from us. We also encourage any input to refine or improve the procedures. Comments or requests for copies should be addressed to:

Director
Office of Aircraft Services
PO Box 15428
Boise, ID 83715

We, the practitioners of natural resources aviation, are dedicated to the preservation of the environment, safe use of the airspace and cooperation with others.

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Effects of Aircraft Noise on Wildlife

Major Robert Kull
Wright-Patterson Air Force Base, Ohio

The Noise and Sonic Boom Impact Technology (NSBIT) Program Office conducts research to study the effects of aircraft low altitude overflight noise on animals. This presentation described the basic research approach used in noise effects research, some of the ongoing projects and results, and future plans.

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Airspace Management: The FAA Perspective

William Mosley
Federal Aviation Administration

Mr. Mosley's presentation first discussed the Interagency Coordination Guide for Airspace and its usefulness to airspace planners and managers (see also Brian Dean). As the FAA focal point for the review of the guide, he was involved in the coordination process which resulted in the document, and highly recommended it to airspace managers and others interested in the issues of airspace safety and management.

Also discussed were a notice of proposed rulemaking to amend the Temporary Flight Restrictions (FAR 91.137). The Notice of Proposed Rulemaking (NPRM) was published in the Federal Register July 24, 1991 and is now open to public comment. The proposed restrictions would serve to improve the safety of airspace and aircraft during disaster relief operations. It would require aircraft carrying accredited newspersons to coordinate with the official in charge of the disaster, prior to entering an area where a temporary flight restriction has been established

Mr. Mosley also discussed in general terms the question of airspace reclassification, touching on the need to simplify airspace and achieve international commonality. This reclassification, he noted, would have no impact on special use airspace.

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Sonic Boom/Animal Stress Project Report on Elk, Antelope and Rocky Mountain Bighorn Sheep

Dr. Gar Workman
Department of Fisheries and Wildlife
Utah State University

The animal/noise project was initiated as a result of a proposed extension of the Air Force Gandy supersonic range (MOA) in western Utah and eastern Nevada. The research was conducted at the Utah State University Green Canyon Ecology Center, and at Gold Hill, in the desert of northwestern Utah. The experimental animals included elk, antelope, and Rocky Mountain bighorn sheep. These animals were instrumented with heart rate and body temper- ature transmitters, which were surgically implanted in the animals. The animals were released in large enclosures, and in some cases were released to the wild for disturbance tests. This was done to determine effects of various disturbances on heart rate and to establish a baseline physiologic database of normal heart rate and body temperature. The animals were subjected to various types of disturbances, including people on foot, motorcycles, four-wheeled vehicles, fixed wing aircraft, helicopters, and F-16 jet aircraft flown subsonic and supersonic, etc.

The results of these experiments are now being compiled; project reports will be available from Mr. Murray O. Sant, Natural Resource Manager at Hill Air Force Base, before the first of the year. A summary of these projects indicates that the experimental animals habituated to most disturbance factors in a short period of time. The exceptions included people on foot who entered the research enclosures where the animals were kept; fixed wing aircraft at low levels of flight; and helicopter flights at low elevations near the animal enclosures. The animals habituated to subsonic and supersonic jet overflights after about four passes over the animals. This habituation seemed to be permanent, as these same animals did not respond when tested at a later date.

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Airspace Management and Air Operations Considerations

Lt. Col. James Lambert
Air Force Representative
FAA Northwest Mountain Region

Two of the questions that face airspace managers today are how and where the military services are going to conduct flight training in the future. My experience reflects primarily the activities that take place in the seven states of the northwest mountain region, controlled by the FAA. But that experience can also apply to other regions of the country.

Before we talk about the future, though, we've got to understand how DoD airspace is allocated and managed today.

The Federal Aviation Act of 1958 gives the Federal Aviation Administration (FAA) sole responsibility for the safe and efficient management of all airspace within the continental United States. This responsibility must be executed in a manner that meets the needs of all users, both civil and military. Additionally, the FAA's policy on airspace is implemented by FAA Order 1000.1A, Policy

Statement of the Federal Aviation Administration, and is stated in FAA Handbook 7400.2C, Procedures for Handling Airspace Matters.

This policy is stated as follows:

The navigable airspace is a limited national resource, the use of which Congress has charged the FAA to administer in the public interest as necessary to insure the safety of aircraft and the efficient utilization of such airspace. Full consideration shall be given to the requirements of national defense and of commercial and general aviation and in the public right of freedom of transit through the airspace. Accordingly, while a sincere effort shall be made to negotiate equitable solutions to conflicts over its use for non-aviation purposes, preservation of the navigable airspace for aviation must receive primary emphasis.

These policy statements mean that:

- The FAA controls, and is the sole agency for management of, all airspace over the continental U.S. -- not the DoD or other Federal or state agencies.

- National defense airspace has specific categories of navigable airspace allocated and overseen by the FAA (per FAA handbooks 7400.2C, "Procedures for Handling Airspace Matters," and 7610.4G, "Special Military Operations."

Within those general guidelines from the FAA, the DoD has to consider its own needs. And those considerations include both training requirements -- that is, how we will train; and operational factors -- that is, where we will train.

- Training requirements - how we will train:

  -- Include both high (FL450 and above) and low (100 AGL) tactics

  -- Include both fast (supersonic training below FL300 and subsonic speeds in excess of 600 ETS) and slow (helicopter, close air support, and surveillance) training

All indications are that military flight training will continue across the entire spectrum of aircraft performance, and will use the entire envelope of technical capability.

- Operational considerations -- where we will train:

  -- Must take into account the fact that DoD is drawing down in size, and will become about 1/2 its present size in the late 1990's.

  -- This drawdown will require the nation's defense community to do business quite differently -- if we are to maintain a smaller, yet viable, porch. This drawdown has many implications which will be difficult to predict until the full effects are realized.

  -- Two major shifts in how we do business are clear: namely, the necessity of composite training, and the relocation of major segments of our forces.

  -- Future operations will be of a composite nature, where we will actively interact with other types of flying units and ground forces on a day-to-day basis. (For instance, Mt. Home, Idaho, where several types of aircraft from the active duty Air Force and Air Nat- ional Guard will coexist and train together. This will include 5 different types of aircraft on one base.)

  -- An example of a major force shift is the move of the Combat Crew Training Squadron from Castle Air Force Base, in California, to Fairchild AFB in Washington

These shifts in operational training concepts and major training relocations most likely will result in both airspace and environmental impacts -- impacts that will have to be integrated to ensure a smooth and safe transition.

A third consideration in how we do business is the shift of operations from an Active Duty Force to the Air National Guard and the Reserve Forces. This will mean more widely distributed training, and will tend to center around population centers and major civilian airports.

All these considerations will ensure that the Department of Defense work more closely with all sectors of our civilian and aviation community.

The challenges will be many. Cooperation on the part of all the national airspace users will require more precise coordination -- but most of all we will have to communicate a better understanding of each other's needs and mission.

Can we all co-exist and use our skies in a safe and responsible manner -- while accomplishing our tasks and missions? As one aviator, I have no doubt that with our combined skills, talents and creativity -- and working together in a spirit of cooperation -- we can make it happen.

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Interagency Land Use - Range Operations and Ordnance Impacts

Capt. T. J. Williams
Office of the Chief of Naval Operations
U.S. Department of Defense

Captain Williams spoke extemporaneously. We regret that no written abstract of his presentation is available.

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Planned Land Use - The Foundation for Good Environmental Stewardship

Lt. Col. Jim Hegland
Deputy Chief, Environmental Planning Division
Office of the Secretary of the Air Force
U.S. Department of Defense

The air forces of the Department of Defense train for a variety of tactics, mission employment scenarios, and threat environments. The Department of Defense must develop combat capabilities so convincing that potential adversaries will understand that the United States is prepared to meet -- and defeat -- aggression. Air-to-ground training ranges are a critical element to ensuring readiness. This briefing presented the concept of Air Force range planning as the foundation for good environmental stewardship -- through planned land-use.

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Interagency Land Use - Range Operations and Ordnance Impacts: A Case Study from an Operations and Training Perspective

Lt. Col. John Fitch
Quantico Marine Corps Combat Development Command
Virginia

Lt. Col. Fitch's presentation covered a case study of interagency land use from an Operations and Training Perspective -- specifically concerning the Marine Corps Combat Development Command, Quantico, Virginia. He discussed where we have been, where we are now, and where we intend to go with totally integrating Natural Resources Stewardship/Management of 66,000 acres with our primary mission, which is training.

The Marine Corps Combat Development Command at Quantico, Virginia consists of 66,000 green, hilly, beautiful acres. It is located thirty-three miles south of Washington, D.C. near the eastern boundary of the base of the Potomac River. Its location puts it between the river and the railroad. Two major north-south transportation routes (U.S. Route 1 and Interstate 95) cut through the Base. Also, the main north-south rail line runs through the Base. These three transportation routes have had a tremendous impact on the growth and development of the surrounding area around Quantico -- an impact that often results in external encroachment on the Base.

The Base also faces internal encroachment, due to base closures, encroachment, etc. The Marine Corps Base is the only "Green" left in North Virginia. As a result, "Let's Go There to Train!" is a familiar refrain.

Interagency Land Use includes:

-- 6,000 acres with Prince William County Forest Park (National Park Service);
  - Joint Land Use -- "Ad Infinitum" (Memorandum of Agreement between the Secretary of the Navy and the Secretary of the Interior);
  - This area serves as our buffer to the north; we're the Park's buffer to the south;
  - We're good neighbors; overall we have good cooperation and communication, but there are some disagreements, e.g. Chesapeake Bay Act (all streams on base flow east (some through the park) to the Potomac River - to the Chesapeake Bay)

The bottom line is "We must all hang together, or most assuredly we'll all hang separately!"

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Soil Erosion and Sedimentation Control: Meeting Compliance Requirements While Sustaining the Mission

Eunice Vachta
Soil Conservationist
Fort Bragg, North Carolina

Compliance with the Clean Water Act at Fort Bragg and in the State of North Carolina is addressed by 1) standards for surface water quality as expressed in turbidity units, and 2) requirements for erosion sediment control plans and practices to be implemented for earth disturbance activities.

Soil and water resource protection at Fort Bragg is being carried out through watershed management. Compliance related tasks involved in this approach include assessment and prioritization

of degraded sites, erosion/sediment control project origination and management, and water quality measurement.

Compliance-related tasks that address earth disturbance activities include providing field evaluations and recom- mendations pertinent to wetlands protection and providing technical guidance and prescribing test management practices for erosion/sediment control. Recommendations and guidance for erosion/sediment control are provided to installation personnel and troop units involved in earth-disturbance activities associated with training activities, troop projects, forestry management, and grounds and range maintenance operations.

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Techniques for Restoration and Enhancement of Endangered Species Habitat, Disturbed Areas and Wetlands

E. Carl Brown
Chief, Wetlands & Terrestrial Habitat Group
U.S. Army Engineer Waterways Experiment Station
Vicksburg, Mississippi

The scientists at the U.S. Army Engineer Waterways Experiment Station (WES) conduct research and provide technical assistance in (among other things) restoration of endangered species habitat, disturbed land areas, and wetlands. The thrust of these activities is to identify or develop techniques that help resources managers improve cost-effectiveness and success in resources management. Examples of such WES activities and products include:

- **Endangered Species Habitat Restoration.** Natural resources management personnel at Camp Pendleton Marine Corps Base in California, WES scientists, and biologists of the U.S. Fish and Wildlife Service cooperated in the development of a plan for restoration of disturbed riparian areas on Camp Pendleton to provide 150 acres of nesting habitat for the Endangered Least Bell's Vireo. The restoration was initiated in 1990 and is well on the way to success.

- **Low-Maintenance Vegetation.** WES developed a "Field Guide on Low Maintenance Vegetation" that can help resources managers in the selection of plant species that reduce grounds maintenance time and costs. One example is "Buffalo Grass", which has been used successfully in the midwest in place of more traditional turf grasses. Buffalo Grass is a low-growing species that requires mowing only two times per growing season, in contrast with up to five mowings required by the more traditional turf grasses. The concept of low maintenance vegetation should be of value in the selection of vegetative cover for both training and cantonment areas on military installations.

- **Biotechnical Approaches to Shoreline Stabilization.** As applied here, the term "biotechnical" refers to the use of plants in combination with low-cost geotextiles and or engineering structures to stabilize shorelines of lakes, streams or coastal areas. The concept has been used effectively on several Corps reservoir projects and in connection with stabilization of islands created with dredged material. The advantages of the biotechnical approach over traditional engineering approaches include lower costs. Additionally, the vegetation used may ultimately provide resting, nesting, feeding or escape habitat for wildlife. While the biotechnical approach to land stabilization has been applied primarily to shorelines, the concept has potential application to upland land stabilization as well.

- **Wetlands Restoration or Development.** WES scientists have been involved in research related to wetlands protection, restoration and development for nearly 20 years. Much of this work

has been related to identification of beneficial uses of dredged material. Within the scientific community there is controversy about whether the functions or attributes of restored or developed wetlands equate to functions and attributes of natural wetlands. While we are still learning about the processes that make wetlands work, the technology is available to duplicate at least some functions and attributes of natural wetlands. There are two guiding principles in wetlands restoration or development: (1) the objectives for the wetlands performance must be clearly defined right up front, with the measure of success based on those objectives, and (2) while the technology exists to restore and develop wetlands, the cost effectiveness of such activities must be determined on a case-by-case basis. There are scientists at WES who can help guide the planning for wetlands restoration and development activities on military installations.

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Department of Defense Explosives Safety Board (DDESB) and its Role in Ordnance Clean-up

Eugene Clark
Explosives Safety Board
U.S. Department of Defense

The Explosives Safety Board was the outgrowth of a major explosives accident that occurred on 10 July 1926 at the Naval Ordnance Ammunition Depot in New Jersey.

This accident virtually destroyed the depot, caused heavy damage to the adjacent U.S. Army Picatinny Arsenal and the surrounding communities, killed 21 people and seriously injured 51. The monetary loss to the Naval Depot alone was $46 million in 1926 dollars.

The accident resulted in a full-scale Congressional investigation and, on completion, the seventieth Congress, in House of Representatives Document 199, directed the establishment of a Board to keep the Secretaries of the War and Navy Departments informed about storage conditions of ammunition and explosives, with particular emphasis on preventing loss of life within and without storage reservations.

When the Defense Department was established by the National Security Act of 1947, the existence of the Board and its function were updated. The new authorization is contained in U.S. Code 172. The DDESB reports to the Deputy Assistant Secretary of Defense (Environment), who reports to the Assistant Secretary of Defense (Production and Logistics).

The DDESB consists of the chairman and a board member from each service: the U.S. Army, U.S. Navy and U.S. Air Force. The chairman is a military officer, in the Grade of Colonel or Navy Captain or higher, and the assignment rotates between the services every three years. The board members are assigned by their respective services and usually occupy the explosives safety or an ammunition logistical function within their service. They, in turn, have a senior civilian alternate. The Board is supported by a full-time secretariat. The secretariat consists of three divisions: the Military Division with three military officers of grade Colonel or Navy Captain, representing their respective military departments; the Operations Division, with six GM GS 15 safety engineers; and the Technical programs division with five GM GS 15 engineers and scientists. There is also an administrative staff of five clerical/administrative personnel. In addition, the Board may convene special groups to work with the secretariat to study or develop positions on specific issues.

DDESB Functions

The current charter of the DDESB directs it to provide impartial and objective advice to the Secretary of Defense, the Secretaries of the military departments, and the Defense agencies, on all aspects of explosives and ammunition. This includes the manufacturing, testing, handling,

maintenance, developing, demilitarization, disposal, transportation and storage of ammunition and explosives; and the construction and siting of facilities within the United States and overseas when under U.S jurisdiction or when planned for U.S.-titled ammunition and explosives.

DDESB develops and publishes explosives safety standards intended to provide a reasonable degree of protection to personnel and assets. These standards establish minimum separation distance between specific types and quantities of ammunition and explosives and other facilities. The standards also contain requirements for electrical systems, lightning protection, testing and hazard classification of ammunition and explosives, mishap reporting and real property contaminated with explosives and ammunition. The military departments publish service-unique regulations that are consistent with, and implement, the DoD standards. Initially, these standards were based on data from explosives accidents. They have been, and continue to be, validated by continuous research, development, testing and evaluation.

In addition, DDESB provides oversight by review and approval of the location and design of ammunition and explosives facilities, hazard classification of ammunition, testing for explosives safety reasons, and control and release of land with potential for ammunition or explosives contamination. Also, DDESB conducts on-site surveys on a periodic basis wherever U.S.-titled ammunition is located, to assess compliance with explosives safety standards. The results of these surveys are reported to the respective military department. A summary of explosives safety posture, along with the status of other DDESB activity, is reported to the Secretary of Defense and the Secretaries of the military departments on an annual basis.

The DDESB also keeps abreast of explosives safety issues through liaison with other government agencies, with its counterparts among the explosives safety community in the North Atlantic Treaty Organization (NATO) and with other countries, such as the Republic of Korea and Australia.

Ordnance Contamination - Land/Facilities

More to the interest of this forum, it is recognized that land and facilities have been contaminated with ammunition and explosives from DoD activities.

Manufacturing explosives and energetic material can result in residue within the processing equipment, and in sumps, ponds, and waste disposal areas. Functioning ammunition in the developmental stage, and ammunition being used for proof and acceptance tests, can result in unexploded ordnance or undetonated explosives at the test site. Training with live ordnance can also result in ammunition and explosives residue at training areas. Also, there can be residue at ammunition disposal sites.

Regulatory Controls

There are regulatory controls to prevent the release of land that may be a hazard to the public from residual ammunition and explosives. DoD 6055.9-Standard, Ammunition and Explosives Safety Standards has requirements relating to the release of DoD land and facilities potentially contaminated with ammunition or explosives. Each military has regulations implementing the DoD standard.

Contamination Controls

There are efforts directed towards prevention of contamination. For example, subcaliber ammunition is often used in training situations, with a subsequent reduced hazard should the ammunition not function properly. Many ranges have laser targeting, which reduces the amount of live fire. Containment facilities have been built to test fire ammunition with depleted uranium.

Land and sea burial of ammunition is no longer allowed, and monitoring of existing disposal sites has been generally increased. Disposal facilities for chemical ammunition have elaborate design

features to contain both the effects of detonation and chemical vapors. An incineration process for contaminated soil has been developed and employed; also, a plant to extract white phosphorous from ammunition and to convert it to phosphoric acid is currently being operated.

DoD explosives safety standards also require that potentially contaminated land be identified on the installation master plan and that controls be established to warn against unauthorized entry.

Finally, release of suspect land must be reviewed and approved through command channels, with final review by DDESB. DoD explosives safety standards establish clearance requirements and prohibit the release of land unless it has been rendered innocuous. Limited-use outgrants may be arranged after appropriate decontamination and with restriction for activities that do not require excavation, such as wildlife preserves.

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An Introduction to the Naval Explosive Ordnance Disposal Technology Center

Stephen Bennett
Indian Head Naval Explosive Ordnance Technology Center
Maryland

The Naval Explosive Ordnance Disposal Technology Center (NAVEODTECHCEN) is located on the Stump Neck Annex of the Naval Ordnance Station, Indian Head, Maryland. NAVEODTECHCEN provides support to the co-located Army, Air Force, Navy, and Marine Corps Service Detachments and the Joint-Service Military Technical Acceptance Board established by the Department of Defense to approve Explosive Ordnance Disposal (EOD) procedures and equipment for service use.

NAVEODTECHCEN is responsible for the research and development of specialized equipment, tools, techniques, and procedures required to support operations EOD units in the location, identification, render safe, removal, exploitation and disposal of surface and underwater explosive ordnance.

The joint-service program encompasses all current and obsolete domestic and foreign explosive ordnance, including improvised explosive and nuclear devices that may be employed by dissident and terrorist groups. Significant support is provided to activities concerned with the reclamation of ordnance-contaminated land and water areas. Special support is provided to the Federal Bureau of Investigation, the Secret Service, civilian law enforcement agencies, and other government departments

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Ordnance Surveys - A New Approach

James Arnold
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Army ordnance testing and training operations have been conducted on Army installations specifically selected and designed for those operations for many years. However, many of these installations have been identified for base closure and or realignment and are contaminated with unexploded ordnance

Due to poor record keeping, many of the old ordnance impact areas cannot be located or are ill-defined. This presentation discussed an unexploded ordnance survey approach to include

assumptions, considerations, the survey concept, personnel, and equipment. The intent of this survey approach is to locate the target areas of old ordnance impact areas, thereby defining the extent of the unexploded ordnance contamination.

The unexploded ordnance survey is generally conducted in four phases based on site-specific considerations, which include the intended future land use. Those four phases are:

1) Historical data review;
2) Level I surface survey;
3) Level II subsurface survey; and
4) Level III subsurface survey.

Several nonintrusive geophysical instruments to aid in the conduct of the survey were discussed. One such instrument is the Surface Towed Ordnance Locator System (STOLS). A recent, successful unexploded ordnance survey incorporating STOLS into this survey approach was discussed. In summary, this unexploded ordnance survey approach is designed to provide a safe, thorough, and economically feasible characterization of land contaminated with unexploded ordnance.

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Interagency Land Use -- Ordnance Clean-up

Capt. Michael Anderson
Air Base Operability
Eglin Air Force Base, Florida

Captain Anderson spoke extemporaneously. We regret that no written abstract of his presentation is available.

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ITAM Overview

Dr. Vic Diersing
Army Engineering & Housing Support Center
Fort Belvoir, Virginia

We regret that no abstract of Dr. Diersing's presentation is available.

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Implementation of the ITAM Program - An Army Command Perspective

Scott Klinger
Fort McPherson Army Forces Command
Georgia

The natural resources program on FORSCOM installations covers eight major areas: forestry, fish/wildlife management, endangered species, land management, outdoor recreation, agricultural outleasing, NEPA compliance, and wetlands delineation. The "glue" that holds all of this together in a manageable form is the Integrated Training Area Management (ITAM) program. Following a brief discussion of the programmed and actual expenditure of funds ($5.4 million in FY 91) from FY 90 - FY 95, we next discussed the current status of the ITAM implementation plan at the selected FORSCOM

installations. The data presented was for fourteen installations and covered four main areas: Land Condition Trend Analysis (LCTA), Geographic Resource Analysis Support System (GRASS) installation and training, erosion control efforts, and the Environmental Awareness program, which is mainly education of the commanders and trainers.

Six problem areas in the implementation process were identified and discussed. Two of the biggest problems are lack of support from the trainers and inadequate staffing. A somewhat lesser problem is diversion of funds by installation commanders. This is being corrected by two methods: the first is a back-door transfer of funds directly to the DEH budget personnel, bypassing the installation budgeteers. The second, and long-term, solution was to convince the FORSCOM commander that ITAM is a Class I, must-fund requirement because it enables commanders to comply with the requirements of both the Clean Water and Endangered Species Acts. The conclusion was that the biggest limiting factor to full implementation of the ITAM program are the priorities and attitudes of the commander.

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The Integrated Training Area Management Program at Fort Carson and Pinon Canyon

Gary Belew
Headquarters 4th Infantry Division
Fort Carson, Colorado

The military community has become increasingly aware of the need to maintain or improve the condition of its training lands. To meet this challenge, the Integrated Training Area Management (ITAM) program has been developed and continues to be refined.

The full-scale implementation of the ITAM program on Fort Carson and the Pinon Canyon Maneuver Site began in earnest in 1988. To date, all six major elements of the Program have been incorporated to some extent within the management system. Successes as well as problems have been documented. Obstacles still exist, such as funding requirements, coordination with the military, personnel shortfalls, etc.

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Camp Shelby ITAM Implementation

Dr. David Price and Mr. Jerry Thompson
U.S. Army Civil Engineering Research Laboratory

Beginning in 1992, Camp Shelby, Mississippi is faced with the expansion of the level and location of tank maneuvers. The shrinking of the active duty Army forces has been the driving force behind this move, in addition to new training requirements for tank maneuvers.

In order to meet this expanded training mission, and because Camp Shelby utilizes US Forest Service land for the majority of its training lands, a completely new Special Use Permit was required to be entered into. Along with it went a new Environmental Impact Statement. The US Forest Service, as landlord, required that ITAMS, along with a Geographic Resources Analysis Support System (GRASS) workstation, be sited at Camp Shelby as part of the mitigations for the expected damages.

This process began with the development of a digital database of the physical features of the Camp Shelby landscape. Digital map layers of the soils, slope, current facilities and environmentally sensitive plant and animal species, along with other factors, were produced. Using this environmental information, GRASS was used to determine those areas on Camp Shelby where training would produce

the least impact, while avoiding sensitive areas such as Gopher Tortoise colonies and wetlands. GRASS was also used to allocate Land Condition Trend Analysis (LCTA) sites to determine baseline conditions, and to monitor environmental change over time.

This process has resulted in a set of training areas, and mitigation measures, that are acceptable to the Forest Service and others involved, and that still meet the requirements for the training mission of Camp Shelby.

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Orchard Training Area LCTA Implementation

Marjorie Blew
Orchard Training Area
Idaho Army National Guard

In the Orchard Training Area (OTA) in southwestern Idaho, the Land Condition-Trend Analysis Program (LCTA, USA-CERL) was implemented in FY 1989.

Aspects of the program were customized to meet the special needs of the training area. These include: specification of the type of disturbance (whether due to military training, livestock grazing, or wildlife activity); an active ground burrow census of the Townsend ground squirrels and badgers; special control plots in an area 5 km outside the OTA boundary; and special use plots on revegetation sites. Special plots were also established this year to monitor a Category 2 plant species, Lepidium papilliferum.

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Track B

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Wetlands Technology -- National Wetlands Inventory

William Wilen
Head, National Wetlands Inventory
U.S. Fish and Wildlife Service

We regret that no abstract of Mr. Wilen's presentation is available.

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Wetlands Delineation/Evaluation Techniques and Management Implications for Military Installations

Russell F. Theriot
Research Biologist and Program Manager
Wetlands Research Program
U.S. Army Corps of Engineers Waterways Experiment Station
Vicksburg, Mississippi

Wetlands possess a wide variety of attributes and functions that are viewed as valuable by society. These include wildlife and fishing habitat, floodflow alterations, sediment stabili-zation, nutrient removal, and others. Cumulative impacts of development over the past two hundred years have reduced the acreage of wetlands roughly by half, with a corresponding reduction in the fuctions those wetlands used

to provide.

Although there is general agreement that the protection of wetland functions and social value is a worthwhile goal, there is not agreement on wetlands delineation or exactly how to measure wetland functions. In an effort to address those difficult issues, the U.S. Army Corps of Engineers, working with other Federal, state, and local agencies, environmental and industry groups and universities, is conducting a Wetlands Research Program to address the technical aspects of these issues. The findings will have definite implications for lands managed at military installations.

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U.S. Army Corps of Engineers' Regulatory Program: When Do I Need to be Involved?

Rich LeClerc
Indian Head Naval Ordnance Station
Maryland

As personnel in charge of ensuring that our fish, wildlife, and other natural resources projects are in compliance with all appropriate Federal/state laws/regulations/directives etc., we must know, specifically, what triggers certain jurisdictions to become applicable.

The U.S. Army Corps of Engineers (COE) handles the day-to-day operations of regulating certain activities under the Clean Water Act (Section 404), the Rivers and Harbors Act of 1899 (Section 10), and the Marine Protection, Research and Sanctuaries Act of 1972 (Section 103). Knowing what the jurisdictional limits of each authority are, and when they are triggered, is of paramount importance to the people getting the work done, not to mention to the Commanding Officer. This paper discussed, in detail, the critical information required to determine whether or not jurisdiction has been triggered.

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Conflicts Between Wetland Regulatory Policies and the Preservation of Valuable Upland Habitat

William H. Rogers
Cherry Point Marine Corps Air Station
North Carolina

In the coastal plain of North Carolina, current state and Federal programs that regulate wetlands are forcing the destruction of locally scarce, high value upland habitats in an effort to preserve marginal wetlands that are locally abundant.

A brief case study of a Military Construction project was presented, and the impacts on water quality and wildlife were discussed. Current DoD wetland policies were reviewed. In addition, the pros and cons of some possible solutions to the problem were discussed.

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Piute Funds Expansion: Win-Win Cooperative Waterfowl Conservation Effort

Christopher J. Rush
Natural Resources Planner
Edwards Air Force Base, California

Edwards Air Force Base, Ducks Unlimited, the Los Angeles County Sanitation District, and the California Department of Fish and Game have cooperated in the development of water impoundments intended for uses that include providing rest habitat for migrating waterfowl.

The Piute Ponds Expansion Project enhanced an existing 320 acres of wetlands habitat on Edwards AFB by developing an additional 170 acres of seasonal water impoundments. Completed in 1989, this interagency cooperative development provided additional benefits that include:

- -- expanding the county's available evaporation pond capacity;
- -- flood control;
- -- effluent water reuse;
- -- preserving Rosamond Dry Lake's emergency potential for aircraft landings;
- -- maintaining military training opportunities;
- -- reducing bird-aircraft strike hazards; and
- -- enhancing existing outdoor recreation use opportunities.

Engineering and development costs for the project ($250,000) were provided by Ducks Unlimited. Environmental documentation and review were accomplished by Edwards AFB and the Department of Fish and Game. Maintenance of the new developments is the responsibility of the County Sanitation District. This win-win development project served to accomplish the needs and desires of all participating agencies.

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Recovering Endangered Species

Kim Mello
Wildlife Biologist
Fort McCoy, Wisconsin

Over the first few days of the conference we heard presentations on, and references to, endangered and threatened species. The Endangered Species Act recovery plans, Section 7, critical habitat, and the role of the U.S. Fish and Wildlife Service were just some of the topics that were discussed. Although the theme for this session was "Recovering Endangered Species," some of the presentations took a wider look at the issue and also discussed questions of management of endangered and threatened species under our protection.

There are over 24 million acres that are under the Department of Defense. Twelve million acres alone are Army lands. DoD lands contain some of the best habitats for, and populations of, endangered and threatened species (both Federal and state). On 15 Army installations alone, there are 65 Federally-listed species.

Although we currently have some very controversial issues with endangered and threatened species on DoD lands, I feel that (perhaps with a few exceptions) there can be coexistence with these species and the military training mission (as well as with land use practices such as forestry management).

As natural resource professionals, we must work and communicate with the military trainers and commanders. It has to be a two-way street. DoD has been tasked and challenged with setting the example in the environment and natural resource arenas -- and we must do the same specifically with endangered and threatened species.

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NEPA Compliance and the Multi-Purpose Range Complex at the Pohakuloa Training Area, Hawaii

Dr. Robert B. Shaw and Richard D. Laven
Department of Range Science, Colorado State University
Fort Collins, Colorado

A Finding of No Significant Impact (FONSI) resulting from an Environmental Assessment was presented in May 1986 for the construction of a Multi-Purpose Range Complex (MPRC) at the Pohakuloa Training Area, Hawaii. There was little or no public input in response to the FONSI, and construction was begun on the $24 million project. Near the end of construction in 1990, a lawsuit was filed to halt construction because an Environmental Impact Statement (EIS) had not been done for the project and the plaintiff thought significant impacts had been done to the environment. Judgement was against the plaintiff and construction continued.

An appeal was filed to the 9th Circuit Court. Since MPRC construction was nearly complete and on advice of Department of Justice lawyers, the Department of the Army agreed to settle out of court. The settlement called for: 1) the plaintiff to drop the appeal and allow construction to be completed on schedule and 2) the Department of Army to prepare an EIS for the operation of the MPRC. A recent botanical survey for the EIS has discovered a soon-to-be-listed endangered plant species and numerous candidate species within the MPRC.

Discussion of the following questions may help other installations avoid similar problems: 1) Did the Army do anything wrong? 2) Will the MPRC ever be usable? and 3) Could these problems have been avoided?

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Regional Cooperation: The Key to Endangered Species Management

Beverly Kohfield
Wildlife Biologist, Environmental Resources Branch
Environmental Project Office
China Lake Naval Weapons Center, California

The Naval Weapons Center at China Lake, California is comprised of 1.1 million acres in the upper Mohave Desert. This vast desert area is habitat to three resident Federally-listed endangered or threatened species of wildlife, one state-listed threatened species and several other species of special management concern. The primary species of management importance are the Mohave Tui Chub (Federally Endangered), Inyo Brown Towhee (Federally Threatened), Desert Tortoise (Federally Threatened) and Mohave Ground Squirrel (State Threatened).

Approximately 75% of the entire species population of Mohave Tui Chub and Inyo Brown Towhee occur on the Naval Weapons Center and are managed exclusively by the Navy in cooperation with regulatory agencies. However, populations of Desert Tortoise and Mohave Ground Squirrel are distributed over vast areas of California's Mohave Desert.

In the past, individual agency management of these species had not resulted in recovery or even substantial species gains. To date, land management and endangered species decisions are not coordinated and are often made on a case-by-case basis by the various state and Federal fish and wildlife management agencies and regional land managers. This lack of coordination has contributed to the process which has encouraged the continued decline of these species.

Since 1990, this picture has begun to change for the Mohave Desert and, particularly, for the lands adjoining the Naval Weapons Center. In April 1990, the Center and the surrounding community sponsored a workshop on management of the Mohave Ground Squirrel. This, in turn, led to initiating a multi-species Habitat Conservation Plan for the local and surrounding area, covering some 837 square miles. Involving Federal and state agencies is vital to the plan's success, as is the participation of locally affected counties, municipalities and private land developers.

Recently, the Army at Ft. Irwin National Training Center, the Navy, Bureau of Land Management (BLM), the California Department of Fish and Game, and the U.S. Fish and Wildlife Service began to cooperatively develop a cumulative impact analysis and population modeling for desert tortoises over the entire western Mohave Desert, an area covering some 7 million acres. Additionally, the BLM initiated a multi-species Habitat Conservation Plan/Habitat Management Plan for the same area.

These large-scale, coordinated efforts, and their implementation, are the only real hope for species protection or recovery for widespread endangered or threatened species such as the Desert Tortoise and Mohave Ground Squirrel.

Today, Department of Defense fisheries and wildlife land managers must get involved, if not take the lead, in these large-scale policy-making species protection and recovery plans. Wildlife management policy and decisions will be made with or without DoD participation. This is especially true for major land holders in the region, such as the Naval Weapons Center is in the Mohave Desert.

The Naval Weapons Center Command supports pro-active management goals of protecting the Center's environment and resource values through compliance with applicable laws, while supporting the Center's military mission. This can be quite a challenge; however, NWC's commitment is shown by the broad scope of its ongoing and successful programs. The Center feels strongly that protecting our nation includes protecting our nation's resources.

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Endangered Species Management at Fort Hood, Texas

Dr. Dave Tazik
Environmental Division, U.S. Army, Champaign, Illinois
and
Dennis Herbert and John Cornelius,
Fort Hood, Texas

Fort Hood supports substantial populations of two endangered bird species -- Black-capped Vireo and Golden-cheeked Warbler. The Army has had a net positive impact on the vireo as a consequence of military-related fires which favor the successional habitat used by the vireo. Unfortunately, the warbler prefers mature woodland habitat that is adversely affected by such fires. The opposing habitat requirements of these two species militates against a single-species management approach. Management is further complicated by the presence of cattle, which attract cowbirds that parasitize nests of both species.

Training guidelines have been established to protect vireo colony sites from military activities. Cowbird trapping is conducted to enhance vireo reproductive success, and may benefit the warbler as well. Modification of the existing cattle grazing regime may be necessary to further reduce cowbird

parasitism, and will also benefit training.

Surveys are underway or being planned to evaluate the status of other rare and endangered species on the Fort, including cave invertebrates and Croton alabamensis. Actions that can be taken to further endangered species management programs on individual installations were also discussed.

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Guam's Native Birds and the Brown Tree Snake

Bruce Reinhardt
Environmental Resources Division
Beale Air Force Base, California

The native forest birds of Guam have declined significantly in the past two decades. The decline is correlated with the introduction and range expansion of the Brown Tree Snake (Boiga irregularis). B. irregularis is a nocturnal, arboreal predator of birds and their eggs. Efforts are in progress by the government of Guam and U.S. Federal Agencies to control the snake and enable the recovery of native bird populations.

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Conservation of the Endangered San Joaquin Kit Fox at Camp Roberts Army National Guard Training Site, California

William H. Berry
Commander
Camp Roberts Army National Guard Training Site
Camp Roberts, California
and
William Stanley
EG&G Energy Measurements Inc.
Camp Roberts, California

The endangered San Joaquin kit fox has been known to inhabit the Camp Roberts Army National Guard Training Site since the early 1960s.

In order to comply with Section 7 of the Endangered Species Act the California Army National Guard (CA ARNG) established a conservation program composed of installation-wide policies to reduce the number of foxes accidentally injured or killed and the amount of their habitat that is disturbed.

The policies include: education of personnel using the installation; reducing speed limits; limiting off-road vehicle use to training-required activities; and requiring a survey by a wildlife biologist to identify and protect kit fox dens for all projects involving ground-disturbing activities. CA ARNG also established a 30-year research project to assess the effects of installation operations on kit foxes and develop means of reducing those effects.

U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion that states that activities at Camp Roberts do not threaten the species and that three foxes could be harmed or killed by CA ARNG-sponsored activities before consultation with USFWS would have to be re-initiated.

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Urbanization and a Wildlife Corridor at Fort Belvoir

Scott Belfit
Environmental & Natural Resource Division
U.S. Army
Fort Belvoir, Virginia

A wildlife corridor is recognized as connecting Huntley Meadows Fairfax County Park to the North with Mason Neck National Wildlife Refuge to the South of the installation. Studies were performed to assess the significance and functioning of the corridor across this rapidly developing installation.

The forested lands were mapped and corridor bottlenecks identified using IR photography and GIS. Sampling of terrestrial non-game vertebrate populations by pit-fall and Sherman live trapping techniques revealed relative diversities at sites within the corridor.

Higher diversities were discovered at sites within the contiguous corridor, while lower diversities were found at sites isolated by roads and/or construction.

A roadkill survey identified road segments with high wildlife mortality and implied that groups of species avoid crossing roads. Checking culverts for tracks confirmed their use by some species but were inconclusive for most.

While studies continue, working management objectives which include maintaining a continuous band of forested lands at least 250 meters wide and establishing or expanding underpasses at ten specified locations have been proposed.

These objectives are pursued in new construction sitings, conceptual designs, engineering designs, NEPA documents and installation planning documents.

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An Overview of the BASH Reduction Program at Naval Air Station, Patuxent River, Maryland

Kyle Rambo
Natural Resources Manager
Public Works Department
Patuxent River Naval Air Station, Maryland

Patuxent River's BASH program has seen a number of accomplishments over the last five years, but continues to face numerous challenges.

Since the inception of our formal BASH program in 1985, we have reached numerous milestones, including

1) the issuance of NASPAXRIV Instruction 3750.5, "Bird Strike Reduction Program" on 22 May 1986;
2) hosting of a Navy BASH Workshop on 15 July 1986;
3) implementation of weekly surveys of high strike potential bird groups such as waterfowl, shorebirds, and raptors;
4) trapping and banding studies of raptors and waterfowl;
5) clearing of 120 acres of airfield brushland during the winter of 1988-89 for conversion to agriculture outlease;
6) maintenance of 500 acres on or adjacent to the airfield through agriculture outleasing;

7) introduction of bird-proof grain sorghum varieties for use on airfield agriculture parcels;
8) installation of toxic perches in two hangars for bird control in the Spring of 1989;
9) modification of airfield grass cutting contract (effective April 1990), to alter grass height maintenance; and
10) development of a proposal for complete airfield vegetation management in February of 1990.

Challenges yet unresolved include:

1) Maintenance of old concrete rubble area on the airfield;
2) control of trees, shrubs, and other vegetation associated with wetlands, in the face of new non-tidal wetlands legislation;
3) air traffic control tower line-of-sight visibility problems; and
4) fine tuning of grounds maintenance contract specifications for airfield vegetation control.

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Fish Habitat Improvement for Impoundments and Streams

Tom Bryce
Fish and Wildlife Branch
Fort Stewart, Georgia

Fish habitat protection and manipulation offer the natural resource manager excellent opportunities to improve the quality of fisheries on military installations.

The viability of these habitat management techniques must be evaluated for each site; and they must be compatible with the type of fishery, the anglers' needs, the military mission, environmental guidelines, and the program's budget.

A summary was provided of several practical habitat improvement techniques for freshwater impoundments and streams. These management techniques are aimed at improving water quality, fish spawning success, fry and fingerling survival, predator-prey balance, angler catch rates, and the general health and productivity of the fishery.

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The Natural Resources Manager in the Decade of the Environment

Gene Stout
Natural Resources Branch
Fort Sill, Oklahoma

Natural resources managers must embrace the overall environmental program to be successful in this decade of heightened environmental awareness within the Department of Defense. Opportunities for funding for environmental programs are greater than they have ever been. Meanwhile, those programs which are identified as solely natural resources with few environmental compliance requirements face ever-tightening maintenance dollars and mandates for personnel cutbacks.

The overall environmental arena offers many innovative means to accomplish traditional and innovative natural resources objectives. The National Environmental Policy Act, the Clean Water Act, the Sikes Act, the Endangered Species Act, and a variety of hazardous and toxic materials-related laws should be everyday tools in the arsenal of Defense natural resources managers.

Instead of facing program cutbacks, the natural resources manager who becomes an environmentalist, and who participates in the environmental planning and budget process, can anticipate significantly increased funding and personnel to meet the challenges of managing Defense lands for both military and national priorities.

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The Natural Resource Manager's Role in the Superfund Program's Ecological Risk Assessment

Matt Klope
Whidbey Island Naval Air Station
Washington

The Superfund program on any military installation involves a complex communication matrix between regulatory agencies and project personnel.

From the beginning of any Superfund program, many questions relating to all aspects of natural resources will have arisen. Questions pertaining to monitoring well placement, background sampling areas, and existing natural resources need comment from the on-site manager. Ecological risk assessment is one of the deciding factors in the program's remediation process and yet has the least information available. The on-site natural resource manager can provide valuable ecological assessment information that will save the program monetarily, ensure the environmental regulations are followed, and provide the best protection for the resources under the installation's stewardship.

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The National Wild Turkey Federation

Dr. James Earl Kennamer
Wild Turkey Center
Edgefield, South Carolina

The National Wild Turkey Federation is a non-profit membership organization dedicated to the wise management of the American wild turkey. A number of NWTF programs have been used and would be beneficial to military installation wildlife managers.

The NWTF funds state Superfund projects in such areas as education, hunter safety, the Turn In Poachers program, and habitat management. The NWTF also advises land managers, and state and Federal agencies, on practices which pertain to wild turkey management. Also available is Project HELP (Habitat Enhancement Land Program), which provides wildlife seeds and seedlings at wholesale prices.

The NWTF also coordinates, with state wildlife game agencies, "Target 2000", a plan to restock all available wild turkey habitat by the turn of the century. The NWTF coordinates and has financially supported research grants, totalling over $1 million in 27 states, as well as providing a bibliographic service on publications concerning the wild turkey.

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Conservation Volunteer Program at the Marine Corps Combat Development Command, Quantico, Virginia

Tim Stamps
Natural Resources Training Area
U.S. Marine Corps Base
Quantico, Virginia

The Marine Corps Combat Development Command, which occupies nearly 60,000 acres, is located 35 miles south of Washington, D.C., and is within easy commute of over 1,100,000 area residents. Many of these residents participate in hunting, fishing and firewood gathering programs on the installation and, through these activities, have become interested in natural resources management.

From among these interested citizens a Conservation Volunteer Program has been developed. The program has grown from 19 volunteers, who contributed 1,469 hours of service in fiscal year 1986, to 98 volunteers who contributed 9,527 hours of service in fiscal year 1990.

The value of the volunteer service provided in 1990 equals $107,372.56, based upon civil service salary rates. The Conservation Volunteer Program contributes significantly to the accomplishment of the natural resource management mission at the Marine Corps Combat Development Command.

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Enhancing the Military Mission While Serving the Public at Marine Corps Air Station Kaneohe Bay, Hawaii

Dr. Diane Drigot
U.S. Marine Corps Air Station
Kaneohe Bay, Hawaii

Both the military and the public are served when interested, capable volunteers help to manage and enhance the natural and cultural resource assets of host military installations. Cultivating such assistance has been a priority at Marine Corps Air Station Kaneohe Bay, Hawaii. Such an access policy is the most viable option in the current environment of base closures and diminishing budgets.

Our peninsular home is less than five square miles in area; is anchored to the most populous island of Oahu in the Hawaiian Island chain; and is surrounded by some of the most pristine waters in the state.

Public access pressure provides a constant challenge to military commanders with already limited land and water training areas.

The public is attracted to:

- our scenic and pristine beaches, for fishing and other water sports;
- our wildlife protected areas, to view thousands of seabirds, shorebirds, migratory and resident endangered waterbirds;
- our unique fossil and geological formations, which attract international scholarly attention;
- our numerous ancient Hawaiian historic sites and properties, some listed in the National Register of Historic Places and considered sacred by traditional cultural groups; and
- our historic military structures associated with World War II.

This slide-illustrated paper described how we accommodate limited public use in such a manner that it improves our knowledge and management of those natural and cultural resources, thus enhancing our community standing as responsible custodians of the environment. By treating public access interest as an asset, not a liability, we have been able to:

- o Involve a National Geographic-funded scientist in our bird/aircraft strike hazard reduction program;

- o Develop reciprocal relationships with independently-funded scientists and institutions for access to our protected areas, in exchange for valuable scientific information and management assistance;

- o Host educational "ecology camps" for local youth, thus triggering sequel volunteer assistance in trail maintenance, bird habitat restoration, and other required resource management activities;

- o Conduct predator control work by volunteer auxiliaries to our Game Warden staff, thus contributing to a recent doubling of our endangered waterbird population;

- o Develop unique National Park Service-designed outdoor exhibit pavilions, a Nature Trail, and an interpretive hiking program to satisfy the public demand for access within manageable numbers and with minimum impact on the resource base and the military mission.

These initiatives have received extremely favorable media coverage and numerous national, state and local awards from both the public and private sectors. This earned "good will" benefits our primary military mission both on- and off-Station.

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Enhancing the Quality of Life Through Outdoor Recreation Opportunities

Alicia Riddell
Military Recreation Assistance Division
National Park Service
U.S. Department of Interior

This presentation focussed on the benefits which outdoor recreation programs and opportunities provide toward the quality of life for those living and working at military installations.

It summarized the role of the National Park Service's Military Recreation Assistance Program in preparing outdoor recreation management plans for Navy, Air Force and Marine Corps installations.

A brief history and status report of the National Park Service assistance activities were provided. Examples were given of outdoor recreation projects such as nature trails; environmental, education and interpretation programs; watchable wildlife activities; and other forms of "in the woods" recreation that are integrated with military forestry and fish and wildlife programs.

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Track C

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Forestry and the Defense Department: An Overview

Tom Egeland
Naval Facilities Engineering Command
U.S. Department of Defense

The public, and the nation in general, are more environmentally conscious today than ever before. Congress is unleashing a vast amount of legislation in the environmental area, covering a broad range of topics relating to the management of forest resources. Debates are continuing on such issues as:

- regional ecosystem conservation and protection;
- perpetuation of native biodiversity;
- prohibitions on clearcutting;
- restrictions on timber exporting;
- protection of old growth and ancient growth forests;
- preservation of forest corridors for the protection of neotropical birds; and more.

Although our responsibility is to meet agency land and natural resources management objectives through sound management practices, we must be prepared to deal intelligently with emerging biological issues, as well as social aspects of our profession.

Too often foresters think the only way to manage forests is through physical manipulation. We must go further and be able to defend our actions.

For example, certain environmental groups have recently argued that clearcutting and even-aged management of forests leads to a substantial reduction of biodiversity. However, we all know that clearcutting is a practical way of harvesting and regenerating a number of commercially productive shade-intolerant species, and that clearcutting can contribute to biodiversity by enhancing the number and kinds of wildlife because such treatments induce a variety of age classes within the forest. It is therefore our responsibility to educate and work with diverse interest groups to resolve conflicts and to secure their support in sustaining and enhancing forest resources.

We need to be open-minded to changing environmental trends that both directly and indirectly affect our profession, and to develop the ability to understand the environmental and political consequences of our actions. We also need to appreciate the ecological significance of such issues as conservation of biodiversity and global climate change.

We must be able to adapt our methods of doing business to comply with new and changing environmental laws and be more open and forthright in dealing with the public as regards identifying management options and making site-specific decisions. Through-out this process, we must continually demonstrate our professionalism and commitment to caring for the land and serving the public.

As we share information on how particular commands and installations are dealing with environmental issues and the new regulations that affect them, it is important to share our expertise and experience so that we can all benefit.

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Integrating NEPA into the Navy's Forestry Program

Steven Hubner
Forester, Atlantic Division
Navy Facilities Engineering Command
U.S. Department of Defense

The Navy has been in the forest management business for 30 years, and the NEPA process has been around for 22 years. Now the Navy's Atlantic Division has meshed these two processes together to the mutual benefit of the Navy and the public. Given the intense public scrutiny which forest management activities are receiving across the country, integration of the NEPA process into the forestry program will assist the Navy in becoming an advocate of environmental compliance rather than a victim of enforcement.

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The Timber Prescription Process

Peter Black
Environmental Management Department
Camp Lejeune Marine Corps Base
North Carolina

Timber management practices modify habitat, whether it be habitat for game, non-game, threatened and endangered species or for pine or hardwood regeneration. The timber prescription and the resulting environmental documentation are the ideal documents which can be utilized to ensure integration of natural resources and compliance with both the military mission and environmental legislation. The timber prescription process is the backbone of the management of all natural resources and provides guidelines for budget preparation and work levels for up to nine years in the future.

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Integrated Natural Resources Planning Using a Geographic Information System

R. Scott Penfield
Range Conservationist
Avon Park Air Force Range, Florida

This presentation focused on management planning on a multi-faceted natural resource program (Avon Park Air Force Range), which utilizes a geographic information system to store and display inventory data and spatial information. This is a case study from inception of using GIS to through its use to date. Examples of management applications were also given.

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Non-commercial Forest Planting as a Suitable Use for Open Military Land

Will Summers
Northern Naval Facilities Engineering Command
Philadelphia, Pennsylvania

Planting forest species for non-commercial forestry interests may be an effective land use treatment for any vacant or disturbed land on military installations.

A combination of thirty-six tree and tall shrub species were used in a series of ten small tree groves at an abandoned airfield at the Philadelphia Naval Station in April of 1991. Sources of support utilized included: Navy Natural Resources funds, installation support, volunteer labor, donations of planting materials from two state agencies, and the USDA Soil Conservation Service.

The total area treated was thirty acres of intensively maintained buffer surrounding twenty athletic fields. All fields were overseeded with a choice of three wildflower mixes to temper need for immediate appearances. Cost savings in deferred grounds maintenance expenses exceeded costs by 33 percent the first year.

Other immediate benefits derived were the restoration of wildlife habitat, soil and water conservation, energy conservation and others. Long-term benefits will be improved appearance, windscreen, visual barriers, shade, biological diversity, and others.

Problems encountered during this project were managing donations of materials, organizing volunteers, acquiring funding, risk-taking and authorization to use the land, too-wet/too-dry weather, and conflict with established land use norms.

Small forest grove planting is a viable land use alternative in improving the built environment of large and small military installations.

Suggestions were offered to others wishing to attempt similar plantings to avoid common pitfalls.

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The Effect of the Forest Resources Conservation and Shortage Relief Act of 1990 on Federal Forest Land Managers

Ron Lewis
Timber Management
U.S. Forest Service
U.S. Department of Agriculture

On August 20, 1990, President Bush signed into law the Forest Resources Conservation and Shortage Relief Act of 1990. This law bans the exporting of unprocessed timber originating from Federal lands, located west of the 100th meridian in the contiguous 48 States, and prohibits the substitution of unprocessed Federal timber for exported unprocessed timber originating from private lands within the same area.

With some specific exceptions, the Act makes it unlawful for a person to acquire unprocessed Federal timber, either directly from a Federal agency or indirectly through a third party, if that person has exported private timber within the previous 24 months.

The Secretaries of the Interior and Agriculture have been assigned the principal responsibility for formulating rules to implement this Act and to monitor compliance. Other Departments and agencies may tier to these rules through Memorandums of Agreement or other arrangements to assure compliance by persons acquiring timber from the Federal lands they administer.

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The Forest Resources Conservation and Shortage Relief Act of 1990 and its Effect on Timber Sales at Fort Lewis, Washington

James Brent
Attorney, Real Estate Division
U.S. Army Corps of Engineers

On 20 August 1990 Congress created the Forest Resources Conservation and Shortage Relief Act of 1990, which prohibited the direct or indirect substitution, by any person, of unprocessed Federal land timber for timber exported from private lands.

The Act indirectly encompassed the Department of Defense, but did not directly provide the DoD with the authority to promulgate rules, monitor, or enforce the Act. Because of the restrictions set out in the Act, it was estimated that Fort Lewis, Washington would lose up to 2 million dollars in lost sales revenues. However, that did not happen.

This presentation discussed the 1990 Act and its effect on timber sales at Fort Lewis, Washington.

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Managing DoD Forest Lands for the Future

Steven W. Stephenson
Martin Marietta Aluminum Sales Inc.
Milan Army Ammunition Plant, TN

In the last few years, particularly in the last decade, natural resource managers have increasingly come under fire from the public. Motives and traditional forest management practices, as well as the ability of the forester to manage Federally-owned forests, have been questioned.

Increased public awareness of environmental problems has precipitated legislation affecting all Federal lands. Many legislated requirements are easy to implement into existing management plans, but others are very difficult to incorporate into management schemes that require all program expenses to be recovered through timber sales or hunting fees.

In addition to legislative mandates, traditional forest practices such as harvesting, reforestation, and use of chemicals are being questioned as to their adverse environmental effects. The woodlands that we manage must be managed in a manner that will gain the confidence of the public that we are knowledgeable and have the best interest of the land and environment at heart.

Specific suggestions to help meet each goal were given.

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Enhancing Forests and Vegetation on Department of Defense Lands

Kenneth J. Andrasko
Office of Policy Analysis
U.S. Environmental Protection Agency

The Department of Defense manages approximately 30.4 million acres of land on military bases in the United States. An estimated 6 million acres of this land are forest. Much of this forest and vegetation has provided DoD with varied environments for carrying out realistic training missions, and has contributed to enhanced liveability on bases. Over time, stresses from heavier equipment use, intensified combat training, and increased residential uses have degraded the quality and usefulness of some of this vital acreage.

This presentation reported on a study commissioned by the U.S. Environmental Protection Agency. It offered an initial assessment of the current state of vegetation and forests on DoD lands and a study of the feasibility of additional natural resource and vegetative management programs.

These programs were evaluated according to the following criteria:

1) ability to increase forest biomass (the total mass of wood and vegetation;
2) ability to lower the expense of heating and cooling;
3) ability to regenerate vulnerable or unusable land utilized in training missions while reducing the costs of land management and training; and
4) the possibilities for sequestration of carbon and the mitigation of the potential effects of global climate change.

The presentation included suggestions and discussion of five programs for achieving these goals and their associated benefits. These benefits include: improvement in military mission, environment, cost savings, quality of life, and the sequestration of carbon to mitigate greenhouse gas emissions.

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Forest Management and Endangered Species at Fort Lewis: Strategies for the Future

Gary McCausland
U.S. Army Forester
Fort Lewis, Washington

Forestry at Fort Lewis has been a model of innovative management practices in the Douglas fir region for 20 years. This commitment has been derived by a working circle of imaginative foresters to meet military training needs, based on interaction with a coalition of various interest groups, e.g. biologists, cultural resource managers, environmental engineers and civilian special interest groups. With a new interest of land use and the population growth in the Puget Sound basin, additional emphasis has been placed on forest management practices at Fort Lewis.

Some of this focus has allowed the program to cooperate with others and meet challenges foresters are faced with in the Pacific Northwest. The inclusion of the Northern Spotted Owl on the Threatened and Endangered Species list has permitted the program to develop new strategies for a holistic approach to forest management.

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Integrated Management of the Old Growth Forests in Jim Creek, Washington

Walter Briggs
Forester, U.S. Navy
Silverdale, Washington

Land acquisition considerations in the 1930s and 1940s led to ownership rights and forest management practices that have left pristine old growth forest stands around two lakes and a creek at the Naval Radio Station (T), Jim Creek, Washington.

These stands are surrounded by thousands of acres of rather even-aged second growth. The old growth is a combination of forest types, ranging from stands of one species to mixed stands. The dominant conifer species are Douglas fir, western red cedar, western hemlock, and Sitka spruce; dominant broadleaved trees are bigleaf maple, black cottonwood and red alder. Ages range from about 40 years for some of the younger hardwoods to approximately 1500 to 1800 for the larger cedar trees. The second growth is mostly western hemlock, Douglas fir and western red cedar, with red alder and bigleaf maple.

The old growth areas are in pristine condition and include the only remaining mid-elevation Sitka spruce forest in the Cascades of western Washington. Due to acquisition practices at the time, the seller retained cutting rights to the merchantable timber standing and lying on said lands. The old growth is contiguous to the two lakes and creek that provide water to the radio station.

Logging cannot be accomplished without significant degradation of the water supply. Also, this is a unique forest resource that can never be replaced.

Negotiations are currently under way for an exchange or purchase of the cutting rights to the old growth. The area has very significant scientific and research opportunities.

Integrated management of this old growth area includes recreation (hiking, fishing, nature education, birding), preservation, fisheries enhancement and scientific study. It has been proposed that the area be designated an RNA if the old growth can be preserved. Surrounding second growth areas will be managed on a sustained yield basis with consideration for all forest resources.

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Conservation and Ecosystem Management: New Perspectives on Managing the National Forests and Grasslands

Jim Caplan
New Perspectives Group
U.S. Forest Service
U.S. Department of Agriculture

Conservation and the stewardship of natural resources have been important forces in the United States for over 100 years.

Today, the National Forests and Grasslands are managed to provide a wide array of uses and values. However, the American people are calling for a change in how public lands are managed.

"New Perspectives" is a nationwide effort by the Forest Service to make the changes that society demands. The changes include an emphasis on land management practices which are scientifically sound, socially responsive, and ecologically sustainable. New Perspectives means the incorporation of ecosystem thinking into conservation practices, and applications of the best in technology and communications.

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Restoring Damaged Lands

Art Schick
Naval Submarine Base, Bangor
Bremerton, Washington

Historically, we've found that whenever the Military Mission changes, our use of Department of Defense lands may also undergo significant change.

In the days when we were gearing up to ward off the Evil Empire -- that is, for most of the last forty years -- that change was often from a natural resource-based use of our lands to the construction of more buildings and parking lots. We had to accommodate more personnel, more equipment, and more training.

Now, with the break-up of the Soviet Union and the end of the Cold War, our mission is again in flux. This time, with an increased public awareness of the environment and new directives from DoD, that change may more often turn land back to a natural resource use. And, before we can use those lands for natural resource purposes, we have to restore them to a self-sustaining state. To paraphrase the great humorist/philosopher Will Rogers, "We've got to protect our land investment...because they just aren't making any more of it."

This panel represented a wide variety of damaged land restoration experience -- from Hawaii, Germany and the Pacific Northwest. Panel members discussed some of the specific ways damaged lands have been restored, and the application of technologies and techniques to other damaged areas.

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Kaho'olawe Target Facility Land Rehabilitation

Bruce D. Ellerts
Natural Resources Specialist
U.S. Navy Pacific Engineering Command
Pearl Harbor, Hawaii

Kaho'olawe is the smallest of the eight major Hawaiian Islands. It has an area of 45 square miles (29,000 acres), of which 10,000 acres have been denuded by hundreds of years of overgrazing by feral ungulates.

Kaho'olawe is 11 miles long, 6 miles wide and its highest elevation is 1,477 feet. It is also the driest of the main Hawaiian Islands, having an average annual rainfall of 10 to 25 inches. Because of almost two hundred years of uncontrolled grazing and browsing by cattle and feral sheep and goats, Kaho'olawe has suffered from severe erosion.

Today, only a handful of feral goats remain on the island and the Navy is continuing its aggressive eradication program along with several other land rehabilitation projects.

One such project is a cooperative reforestation effort between the Navy and the State of Hawaii, Department of Land and Natural Resources. Approximately 47,000 tamarisk, Tamarix aphylla, trees have been planted to date by State of Hawaii foresters coordinated and supported by Navy personnel. Based on the survival success displayed during earlier trial plantings conducted from 1978-1980, and as demonstrated during the last decade, tamarisk trees continue to be the primary species of choice for use in this ongoing conservation effort.

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Restoring Damaged Military Training Land

Wolfgang Grimm
Headquarters U.S. Army, Europe
Heidelberg, Germany

Maneuvering with heavy and fast tracked vehicles causes intense damage to the training land. Loss of protective vegetation cover, soil compaction and increased surface water run-off lead to severe erosion problems.

In order to protect natural resources while keeping training land available for its intended purpose, an extensive program to repair existing training land has been developed and implemented by U.S. Army, Europe.

In this presentation, various land restoration techniques were introduced and discussed.

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Partners in Natural Resource Trusteeship in the Superfund Program

Dr. Alyce Thomson Fritz
Office of Oceans, Resources Conservation and Assessment
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

The National Oceanic and Atmospheric Administration (NOAA) acts on behalf of the Secretary of Commerce as a Federal trustee for living and non-living natural resources in coastal and marine areas. NOAA's trustee resources include anadromous and catadromous fish throughout their range, shellfish, and specific marine mammals found in navigable waters of the United States and their supporting habitats.

Specific legislation, including the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund), establishes the responsibilities of the Environmental Protection Agency (EPA) and of Federal and state trustee agencies for notification and coordination in environmental assessment and in protection of natural resources as related to hazardous waste sites.

NOAA, through its Coastal Resource Evaluation program and network of regional Coastal Resource Coordinators (CRCs), identifies and investigates potential injury to NOAA trust resources in areas likely to be impacted by hazardous waste sites. Approximately 90 of the 500 National Priority List (NPL) sites that NOAA is evaluating are Federal Facilities where NOAA and the Department of Defense (DoD) may share responsibilities for the protection of natural resources.

NOAA provides technical support to EPA and co-trustees in evaluating natural resource concerns, in developing investi-gations and assessing risks, and in developing cost-effective strategies to minimize risks to coastal resources. CRCs act as technical liaisons on coastal resource issues of common interest and work to improve coordination with natural resource trustee agencies. NOAA CRCs have cooperated with EPA and DoD at several Federal facilities in the early planning of remedial investigations and ecological assessments, in order to acquire the necessary information to develop protective remedial alternatives and mitigative measures.

As part of DoD's "Environmental Initiative," NOAA looks forward to increased opportunities for exchange of technical information with DoD Natural Resources Managers in the Installation Restoration and Superfund Programs with the mutual goal of protection and restoration of trustee resources.

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Managing the Built Environment for Quality of Life

Mike Neuzil
Headquarters, Strategic Air Command
Offutt Air Force Base, Nebraska

We have made a great deal of progress in the field of managing the built environment. The changes in the last ten years or so have been phenomenal! It used to be that "bleakness" on our bases was not only accepted, but desired. It was a way of life! We didn't want things to look nice for fear of being criticized. Any money spent on trees or landscaping was a case for fraud, waste and abuse.

Times have indeed changed. Phrases like "Quality of Life" and "Esthetics" have slipped into our vocabulary, and new fields like Urban Forestry and Urban Wildlife have evolved into our management agenda. It's a really different world at our installations -- and I'm glad we're getting there. But there is much more to do.

At SAC, we have four bases that have, or are working on, Urban Forestry Plans, and six bases have been designated "Tree City USA" by the National Arbor Day Foundation. We are showing our people that we care about them by making our bases nice places to live and work. And we are helping to ease the burden on our environment by saving energy, planting trees and creating an urban environment that nourishes life.

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Forests and Urban Growth

David Tice
North American Resource Management
Charlottesville, Virginia

It is perplexing that, at the same time forests are being promoted as solutions to our nation's water quality and atmospheric problems, we are actually losing forest area in many parts of the country. In Virginia, for example, after several decades of increasing forest area, the state is now losing forests at the rate of one acre every eight minutes!

Most of this loss is occurring due to suburban sprawl -- low density development leap-frogging into the countryside, with ever-increasing dependence on the automobile. Virginia Governor Douglas Wilder noted that in the 1980's, Virginia grew 12% in population, but 50% in traffic load.

Besides the direct loss of forest area, the sprawl also fragments remaining forests into smaller and smaller units. Below a critical size, forests become inoperable for timber management. New urban residents complain about forestry operations. Logging trucks have to compete in increasing traffic. Air pollution from the heavy dependence on automobiles threatens forest health.

The problem is not growth or development -- it's how we develop. Growth, after all, can fuel timber markets, making many forest management opportunities more attractive. Sprawling growth that causes significant forest resource losses can quickly outstrip such positive effects, however.

To an extent, some of the measures advocated for land use planning have accelerated the problem. Many of our counties today have a 5-acre or 10-acre minimum zoning in so-called rural agricultural and forestal zones. Instead of protecting important forest resources, these actions too often force growth to consume greater land, increase road requirements, and demand even greater dependence on, and use of, automobiles.

In the Chesapeake Bay region, the 2020 Panel projects that high density development could save 70% of the land that would otherwise be taken up by conventional low density development that has been the recent pattern in Virginia counties. Other environmental savings are similar:

60%	fewer roads
45%	less energy
50%	less air pollution from automobiles
40%	less air pollution from residences
40%	less sedimentation
35%	less water use

When foresters used to talk about "growth management," they meant thinning, fertilizing, and genetic improvement of seedling stock. Today, foresters faced with declining forest area and fragmented forests are having to learn new definitions of the term. Woodland owners and managers are increasingly concerned with the need to accommodate population growth in ways to protect our forest resource base.

Key ingredients that must be addressed to manage growth while protecting forests and other environmental resources include:

- Clustering growth, minimizing the land area needed for buildings and roads.
- Using traditional grid patterns and a pedestrian scale to streets, reducing traffic congestion.
- Mixing commercial and residential uses, creating neighborhoods for pedestrians. Shops, offices, day care centers, playgrounds and schools are carefully designed to be within a few minutes' walk of residences.
- Establishing tree protection and planning codes, combined with open space preservation that will leave substan-tial areas in their natural state. An environmental manager to supervise the forestry program of the community, as well as recycling, wildlife and environmental education programs.

It is important for DoD natural resource managers to examine and participate in decision-making, not only in on-base land planning and development activities, but regionally as well. Decisions being made by jurisdictions dozens of miles away can significantly impact the natural resources on DoD facilities.

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Enhancing the Quality of Life Through Urban/Community Forests

Philip J. Hoefer
Staff Forester
Colorado State Forest Service
Fort Collins, Colorado

Healthy, mature trees growing where people live are an asset to any community or facility. Shade, urban wildlife, wind protection, energy savings, and attractiveness are just a few of the benefits trees add to the quality of living in the "built environment."

Planting and management of trees in and around military housing facilities varies considerably.

This presentation outlined an approach to enhance the quality of the community forest growing around housing and commercial areas of a military facility

It covered the subjects of planning and management, planting and maintenance, partnerships, and public relations/education.

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Managing for Enhanced Biological Appeal in DoD Urban Landscapes

Chester Martin
U.S. Army Corps of Engineers
Waterways Experiment Station
Vicksburg, Mississippi

Landscaping and grounds maintenance activities are high-cost operations at Department of Defense (DoD) installations nationwide, and traditional practices in urbanized settings often result in environments that are biologically sterile.

However, there is considerable potential to implement programs that can effectively create biologically appealing landscapes and reduce maintenance requirements.

The emphasis of this presentation was to

* note problems with standard landscape practices at DoD installations, and

* present alternative methods, primarily with respect to vegetation management, that can provide environmental benefits.

Information was summarized from a study being conducted for the U.S. Air Force, under the guidance of Dr. A. Ludlow Clark (LEEVX).

The installation land manager who wishes to develop a program to provide biologically improved landscapes must first be aware of inherent problems with grounds that are part of the built environment.

On military installations, the setting of concern consists of those areas designated as "improved" and "semi-improved" grounds, which include administrative complexes, housing areas, work areas and facilities, industrial complexes, and urban parks and recreation areas. A common trait of all of these areas is that they are extensively maintained and artificially manicured, to the point that they are biologically sterile and no longer resemble the native plant communities that were part of the original landscape.

The vegetation of urbanized sites is typified by extensive lawns, the predominance of monocultures, substitution of native shrubs and trees with ornamental plantings, excessive shearing and pruning, and extensive physical damage caused by the careless use of mowers and edgers.

Management for enhanced biological appeal can be achieved by developing and implementing appropriate landscaping and grounds maintenance practices that emphasize the quality and biodiversity of native plant communities.

The "naturalistic" approach to landscaping is recommended, which encourages the use of native plants but allows the manager to select preferred species, design for composition and structure, and control succession.

Some basic recommendations include:

- avoiding straight lines and the monotony of repetition;
- increasing both horizontal and vertical diversity;
- maintaining natural shrub and vine cover;
- leaving snags and fallen logs where they don't represent a hazard; and
- planting native species as much as possible.

Benefits of naturalistic landscaping include:

- temperature reduction
- noise abatement
- air filtration
- erosion control
- improved aesthetics, and
- provision of wildlife habitat for a variety of nongame species.

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DEFENSE NATURAL RESOURCES LEADERSHIP CONFERENCE
FOR THE
DEFENSE AND THE ENVIRONMENT INITIATIVE

THEME:
The Department of Defense as a Leader
in Natural Resources Stewardship

U.S. Air Force Academy
Colorado Springs, Colorado
12 - 15 August 1991

SUNDAY - 11 AUGUST 1991

1200 - 1930 Registration at the Hilton Inn

1200 - 1600 Registration at other hotels (Hampton Inn, Holiday Inn, Palmer House)

1500 - 1730 National Military Fish & Wildlife Association Board Meeting - Hilton Inn

1800 - 1930 Social - Hilton Inn

MONDAY - 12 AUGUST 1991

0730 - 0800 Bus transportation to U.S. Air Force Academy from designated hotels (Hilton Inn, Hampton Inn, Holiday Inn, Palmer House)

0800 - 0830 Registration Continuation: Fairchild Hall, Lectinar Area, third floor, USAFA

0830 - 0840 Introduction to Conference
(Dr. A. Ludlow Clark, Chairman, Department of Defense Natural Resources Conference)

0840 - 0845 Welcome
(Lieutenant General Bradley C. Hosmer, USAF, Superintendent, U.S. Air Force Academy

0845 - 0855 Theme/Introduction
(Mr. Thomas E. Baca, Deputy Assistant Secretary of Defense (Environment)

0855 - 0935 Keynote Address
(The Honorable Frank A. Bracken, Deputy Secretary, U.S. Department of the Interior)

0935 - 0945 Administrative Remarks
(Mr. Mike Babler, Chief of Natural Resources, USAFA)

0945 - 1010 Break

1010 - 1050 The Changing Face of the Earth
(Mr. Neil Sampson, Executive Vice-President, The American Forestry Association)

1050 - 1130 Managing for Biodiversity
(Dr. Jerry F. Franklin, University of Washington)

1130 - 1145 Questions & Discussion

MONDAY - 12 AUGUST 1991 (Cont.)

1145 - 1315 Luncheon, Noncommissioned Officers Club, USAFA
Luncheon Speaker: Ms. June Whelan, Special Assistant for Wetlands to the Secretary of Interior

1315 - 1345 Wetlands - Values and National Status
(Dr. Robert E. Stewart, Director, National Wetlands Research Center)

1345 - 1415 Endangered Species - National Issues and Strategies
(Dr. Ralph O. Morgenweck, Assistant Director for Fish and Wildlife Enhancement, U.S. Fish and Wildlife Service)

1415 - 1440 Nonpoint Source Pollution - National Issues and Strategies
(Mr. David G. Davis, Deputy Director of Watersheds, Oceans, and Wetlands, EPA)

1440 - 1500 Break

1500 - 1530 Natural Resources Trusteeship & Damage Assessments Under CERCLA and the Oil Pollution Act
(Dr. Jonathan P. Deason, Director, Office of Environmental Affairs, DoI; and Ms. Grayson R. Cecil, Special Counsel for Natural Resources, National Oceanic and Atmospheric Administration)

1530 - 1600 The DoD/DoI Partnership: Dedicated to Stewardship of our Nation's Natural Resources.
(Mr. Richard R. Roldan, Deputy Assistant Secretary for Land and Minerals Management, DoI)

1600 - 1615 Questions and Discussion

1615 - 1640 Enroute to designated hotels

1800 Enroute to Hilton Inn from designated hotels

1815 - 1900 Cocktails, Hilton Inn

1900 - 2045 Banquet, Hilton Inn
Banquet Speaker: The Honorable Colin McMillan, Assistant Secretary of Defense (Production and Logistics)

TUESDAY - 13 AUGUST 1991

0730 - 0800 Bus transportation to U.S. Air Force Academy from designated hotels

0800 - 0830 Registration

0830 - 0900 Supporting the Military Mission
(Lt Gen Henry J. Hatch, Commander, U.S. Army Corps of Engineers)

0900 - 0930 Challenges in Protecting Coastal Resources
(Ms. Nancy Stehle, Office of the Assistant Secretary of the Navy (Installations and Environment))

0930 - 1000 The Legacy Resources Program - Issues and Priorities
(Ms. Christina Ramsey, Applied Science, Inc., and Mr. Peter Boice, Office of the Deputy Assistant Secretary of Defense (Environment))

1000 - 1020 Break

TUESDAY - 13 AUGUST 1991 (cont.)

1020 - 1050 Partnerships and Cost-Sharing
(Mr. David G. Unger, Associate Deputy Chief, National Forest System, USDA Forest Service)

1050 - 1120 Mainstreaming Natural Resources
(Mr. Gary Vest, Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health))

1120 - 1145 Questions and Discussion

1145 - 1315 Luncheon, USAFA Officers' Club
Luncheon Speaker: The Honorable Douglas Wheeler, Secretary of Resources, State of California

1315 - 1345 Future Directions
(Mr. Thomas E. Baca, Deputy Assistant Secretary of Defense (Environment))

1345 - 1400 Break

1400 - 1630 Service Sessions

1630 Enroute to designated hotels

WEDNESDAY - 14 AUGUST 1991

0800 - 0830 Transportation from designated hotels

0830 - 0900 Natural Resources Values in the NEPA Process
(Mr. Ray Clark, Office of the Assistant Secretary of the Army (Installations, Logistics and Environment))

0900 - 0930 Wetlands Mitigation
(Mr. David A. Tilton, U.S. Fish and Wildlife Service)

0930 - 1000 Riparian Ecosystems: Critical Resources under Russian Invasion
(Dr. Fritz L. Knopf, National Ecology Research Center)

1000 - 1020 Break

1020 - 1050 Endangered Species Recovery
(Mr. Olin E. Bray, U.S. Fish and Wildlife Service)

1050 - 1120 Managing Historic Properties on Department of Defense Installations
(Ms. Lee Keatinge, Advisory Counsel on Historic Preservation)

1120 - 1145 Questions and Discussion

1145 - 1315 Lunch, USAFA Officers' Club

1315 - 1400 Joint Use and Land Management Planning
(Mr. James Colby, Bureau of Land Management, and Dr. Pamela Case, USDA Forest Service)

1400 - 1445 Geographic Information Systems (GIS): Possibilities and Pitfalls
(Colonel Sam Thompson, USA, U.S. Military Academy, West Point, NY)

1445 - 1500 Break

1500 - 1530 GIS Applications (Mr. Emmett Gray, Chief of Environmental Management, Fort Hood, TX)

Begin Concurrent Sessions (Tracks A and B)

1615 - 1715 **Track A: Interagency Land Use, Tracked Vehicle Training**

Moderator: Dr. Thomas L. Thurow, Texas A&M University

Panelists: Ms. Karla Swanson, Area Manager, BLM Barstow Resource Area, CA
Colonel Hal Fuller, Garrison Commander, Ft. Irwin, CA;
Mr. Mark Hilliard, Watchable Wildlife Program Manager, BLM
Mr Thomas Warren, Director, Environment, Energy and Natural Resources, Fort Carson,CO
Dr. Howard Wilshire, Geologist, US Geological Survey

Track B: Wetlands Technology

Moderator: Mr. Peter Boice

Wetlands Technology -- National Wetlands Inventory
(Mr. William Wilen, Head of National Wetlands Inventory)

Wetlands Technology -- US Army Corps of Engineers
(Dr. Russell Theriot, Manager of Army Corps of Engineers Waterways Experiment Station Wetlands Research Program)

1715 Enroute to designated hotels

THURSDAY 15 AUGUST 1991 Concurrent Sessions, Tracks A, B, and C

0800 - 0915 **Track A: Interagency Land Use -- Airspace Management and Air Operations**

Moderator: Lt Col Jim Hegland, HQ USAF Environmental Planning Division

Panelists: Mr. Brian Dean, BLM Airspace Manager;
Major Bob Kull, Armstrong Aeromedical Research Laboratory, Wright-Patterson AFB, OH
Mr. William M. Mosley, FAA, Washington, D.C.
Dr. Gar Workman, Utah State University
LtCol. James Lambert, USAF Rep to FAA Northwest Mountain Region

Track B: Protecting and Enhancing Wetlands

Moderator: Mr. Mike Bryan, Chesapeake Division, Naval Facilities Engineering Command

U.S. Army Corps of Engineers' Regulatory Program: When Do I Need To Be Involved? (Mr. Rich LeClerc)

Conflicts Between Wetland Regulatory Policies and the Preservation of Valuable Upland Habitat (Mr. Bill Rogers)

Piute Ponds Expansion: A Win-Win Cooperative Waterfowl Conservation Effort (Mr. Christopher Rush)

THURSDAY - 15 AUGUST 1991 (Cont.)

Track C: Integrated Forestry Planning

Moderator: Mr. Tom Egeland, Headquarters, Naval Facilities Engineering Command

Integrating NEPA into the Navy Forestry Program (Mr. Steve Hubner)

Using the Timber Prescription Process to Integrate Natural Resources Decision-making (Mr. Peter Black)

Integrated Natural Resources Planning Using a Geographic Information System (Mr. Scott Penfield)

0915 - 0930 Break

0930 - 1045 **Track A: Interagency Land Use -- Range Operations and Ordnance Impacts**

Moderator: Mr. Thomas R. Metz, Office of the Under Secretary of Defense (Acquisitions)

Panelists: Capt T.J. Williams, Navy Department;
LtCol James Hegland, USAF Environmental Planning Division;
LtCol John Fitch, Marine Corps Combat Development Command, Quantico

Track B: Recovering Endangered Species

Moderator: Mr. Kim Mello, Ft. McCoy

NEPA Compliance and the Multi-purpose Range Complex at the Pohakuloa Training Area, Hawaii (Dr. Robert Shaw and Mr. Richard Laven)

Regional Cooperation: The Key to Endangered Species Management (Ms. Beverly Kohfield)

Endangered Species Management at Fort Hood, Texas (Dr. Dave Tazik, Mr. John Cornelius, and Mr. Dennis Herbert)

Track C: Forestry Economics

Moderator: Mr. Don Cole, Army Engineering & Housing Support Center

Non-commercial Forest Planting as a Suitable Use for Open Military Land (Mr. Will Summers)

Effect of the Forest Resources Conservation and Shortage Relief Act of 1990 on Federal Land Managers (Mr. Ron Lewis)

The Forest Resources Conservation and Shortage Relief Act and its Effect on Timber Sales at Ft. Lewis, Washington (Mr. James Brent)

1045 - 1100 Break

1100 - 1150 **Track A: Interagency Land Use -- Training Area Natural Resources Management Technology**

Moderator: Mr. Don Cole, Army Engineering & Housing Support Center

1100 - 1150 cont. Soil Erosion and Sedimentation Control -- Meeting Compliance Requirements While Sustaining the Mission (Ms. Eunice Vachta, Ft. Bragg)

Techniques for Restoration and Enhancement of Endangered Species Habitat, Disturbed Areas, and Wetlands (Mr. Carl Brown, US Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS)

Track B: Recovering Endangered Species

Moderator: Mr. Kim Mello, Ft. McCoy

Guam's Native Birds and the Brown Tree Snake (Mr. Bruce Reinhardt)

Conservation of the Endangered San Joaquin Kit Fox at Camp Roberts Army National Guard Training Site (Mr. William Berry and Mr. William Stanley)

Track C: Managing Forests for the Future

Moderator: Mr. Marlo Acock, Headquarters Marine Corps

Managing DoD Forest Lands for the Future (Mr. Steven W. Stephenson)

Enhancing Forests & Vegetation on Department of Defense Lands (Mr. Kenneth Andrasko)

1150 - 1320 Lunch, USAFA Officers' Club

1320 - 1445 **Track A: Interagency Land Use -- Ordnance Clean-up**

Moderator: Mr. Jim Drake, DoD Explosives Safety Board

Panelists: Mr. Eugene G. Clark, DoD Explosives Safety Board;
Mr. Stephen Bennett, Naval Explosives Ordnance Technology Center;
Mr. James Arnold, U.S. Army Toxic and Hazardous Materials Agency;
Capt Michael Anderson, Air Base Operability, Eglin AFB, FL

Track B: Managing Fish and Wildlife Habitat

Moderator: Mr. Lew Shotton, Office of the Chief of Naval Operations

Urbanization and a Wildlife Corridor at Fort Belvoir (Mr. Scott Belfit)

Bird Aircraft Strike Hazard Reduction (Mr. Kyle Rambo)

Fish Habitat Improvements for Impoundments and Streams (Mr. Tom Bryce)

Track C: Managing Forests for the Future

Moderator: Mr. Pat Cline, Southern Division Naval Facilities Engineering Command

Forest Management and Endangered Species at Fort Lewis: Strategies for the Future (Mr. Gary McCausland)

THURSDAY - 15 AUGUST 1991 (Cont.)

1320 - 1445 cont. Preserving Old Growth Forests at the Naval Radio Station, Jim Creek (Mr. Walter Briggs)

Conservation and Ecosystem Management: New Perspectives on Managing National Forests and Grasslands (Mr. Jim Caplan)

1445 - 1500 Break

1500 - 1615 **Track A: Interagency Land Use Integrated Training Area Management (ITAM) Program**

ITAM Overview (Dr. Vic Diersing, Army Engineering & Housing Support Center)

Implementation of the ITAM Program -- An Army Command Perspective (Mr. Scott Klinger, US Army Forces Command

Implementation of the ITAM Program at Fort Carson (Mr. Gary Belew)

Discussion

Track B: Serving the Resource

Moderator: Mr. Tom Coda, Headquarters Marine Corps

The Natural Resources Manager in the Decade of the Environment (Mr. Gene Stout)

The Natural Resources Manager's Role in the Superfund Program's Ecological Risk Assessment (Mr. Matt Klope)

The National Wild Turkey Federation and DoD (Dr. James Earl Kennamer)

Track C: Restoring Damaged Lands

Moderator: Mr. Art Schick, Naval Submarine Base, Bangor

Land Rehabilitation: Kahoolawe Target Facility (Mr. Bruce Eilerts)

Restoring Damaged Military Training Land (Mr. Wolfgang Grimm)

Partners in Natural Resource Trusteeship in the Superfund Program (Dr. Alyce Fritz)

1615 - 1700 **Track A: Interagency Land Use -- GIS/ITAM Case Studies**

Camp Shelby ITAM Implementation (Mr. Jerry Thompson and Dr. David Price, Army Civil Engineering Research Laboratory)

Orchard Training Area ITAM Implementation (Ms. Marjorie Blew, NGB, Orchard Training Area)

Track B: Serving the Public

Moderator: Mr. Rick Griffiths, Aberdeen Proving Ground, MD

Conservation Volunteer Program at the Marine Corps Combat Development Command, Quantico, VA (Mr. Tim Stamps)

THURSDAY - 15 AUGUST 1991 (Cont.)

1600 - 1700 cont. Enhancing the Military Mission While Serving the Public at Marine Corps Air Station Kaneohe Bay, Hawaii (Dr. Diane Drigot)

Enhancing the Quality of Life Through Outdoor Recreation Opportunities (Ms. Alicia Riddell)

Track C: Managing the Built Environment for Quality of Life

Moderator: Mr. Mike Neuzil, Headquarters, Strategic Air Command

Forestry and Urban Growth: Can They Co-exist? (Mr. David Tice)

Enhancing the Quality of Life Through Urban Forestry (Mr. Philip J. Hoefer)

Urban Wildlife (Mr. Chester Martin)

1830 - 1930 National Military Fish & Wildlife Association Social - Hilton Inn

1930 - 2130 National Military Fish & Wildlife Association Awards Banquet - Hilton Inn

FRIDAY - 16 AUGUST 1991

0700 - 1930 Field Trip, Fort Carson

0800 - 1200 National Military Fish and Wildlife Association Business Meeting

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AUGUST 12-15, 1991
U.S. AIR FORCE ACADEMY, COLORADO

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